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ANNUAL REPORT OF THE

Surgeon-General of the Public Health
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the United States

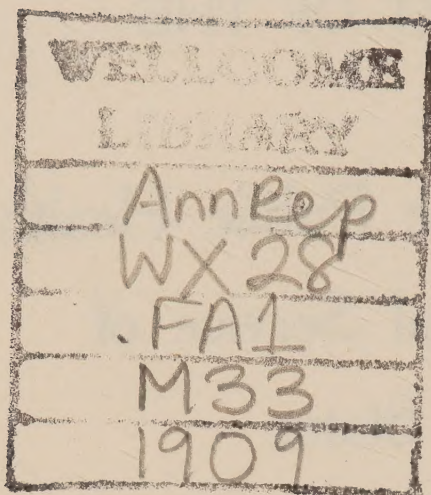
FOR THE FISCAL YEAR

1909



WASHINGTON
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1910



TREASURY DEPARTMENT.

Document No. 2567.

Public Health and Marine-Hospital Service.



OPERATIONS
OF THE
UNITED STATES PUBLIC HEALTH AND
MARINE-HOSPITAL SERVICE
1909



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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
Washington, December 10, 1909.

SIR: In accordance with section 9 of the act of Congress approved July 1, 1902, entitled "An act to increase the efficiency and change the name of the Marine-Hospital Service," I have the honor to transmit herewith the Annual Report of the Surgeon-General of the Public Health and Marine-Hospital Service of the United States for the fiscal year 1909.

Respectfully,

CHARLES D. HILLES,
Acting Secretary.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

ANNUAL REPORT OF THE SURGEON-GENERAL OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

TREASURY DEPARTMENT,
BUREAU OF PUBLIC HEALTH AND
MARINE-HOSPITAL SERVICE,
Washington, D. C., November 30, 1909.

SIR: I have the honor to submit for transmission to Congress, in accordance with the act of July 1, 1902, the following report of the transactions of the Public Health and Marine-Hospital Service of the United States for the fiscal year ended June 30, 1909, this being the thirty-eighth annual report of the service in the one hundred and eleventh year of its existence, and the eighth annual report under its present name.

ANTIPLAGUE OPERATIONS IN SAN FRANCISCO.

In previous annual reports it has been shown that plague was announced in San Francisco in 1900, and that for four successive years the service and the state and local health authorities were engaged in its elimination. There were in that period 119 cases and 113 deaths. Examination of rats continued for quite a long period after the cessation of the disease among human beings, and finally operations were brought to a close; but following the earthquake and fire in San Francisco in 1906, cases of plague began to be reported. A fatal case of human plague was reported in San Francisco in May, 1907, and an active antiplague campaign was begun at once, and has continued to the present time. To June 30, 1908, there were in that city 159 cases of human plague, with 77 deaths.

No case of human plague occurred in the city and county of San Francisco during the fiscal year ended June 30, 1909. A few cases of epizootic plague were found among the large numbers of rats captured in the city and examined at the plague laboratory, as follows: July, 1 rat; August, 1 rat; October, 2 rats. The last infected rat was found October 23, 1909, in a warehouse near the water front. Since that date, although some 60,000 rats have been taken from all parts of the city and examined, none has been found infected.

In view of the tenacious nature of the infection and the fact that it may remain practically dormant for long periods of time, it was deemed necessary to continue the main features of the campaign until all danger of a recrudescence had passed. The original organization was maintained until February 1, 1909, when a considerable reduction of the force was made and the area under sanitary supervision somewhat contracted. In February, 1909, the Citizens' Health Com-

mittee, having fulfilled the humane purposes of its organization, disbanded and returned to the subscribers the remaining portion of the funds. Surgeon Rupert Blue reports that this action necessitated a further cut in the number of laborers employed, and because of this reduction it was found necessary to redistrict the city.

The first, second, third, tenth, eleventh, and twelfth districts, occupying practically the entire water front of San Francisco, were formed into Sanitary Division No. 1, and the fourth, fifth, sixth, ninth, and subtwelfth sanitary districts, of the annual report of 1908, were merged into Sanitary Division No. 2. The force was withdrawn from the old seventh and eighth districts, commonly known as the Sunset and Richmond additions, except when it was necessary to investigate reported infractions of the sanitary law or to inspect the bodies of persons dying therein.

The work of the past year has been a continuation of that of the preceding year, consisting of the rat-proofing of buildings, trapping, poisoning, and the inspection of premises. A thorough inspection of the bodies of all persons dying within the city limits has also been maintained. Inspections of premises are made frequently, for the purpose of maintaining a state of general cleanliness, in respect to the collection and disposal of garbage and the finding and reporting of cases of infectious and contagious diseases. The plumbing of all public and private buildings is inspected, and a large amount of repairs and renewals have been secured.

Whenever a rat-infested place is found, the owner of the premises is notified and detailed instructions given him as to the remedy and time allowed for the abatement of the nuisance. At the expiration of the time, if it is found that he does not intend to comply with the sanitary law the case is referred to the board of health for condemnation proceedings. After a hearing, the board, finding sufficient grounds for action, condemns the property. If, after a reasonable length of time, usually from two to four weeks, the nuisance is not abated, the health officer requests the chief of police to vacate the premises. In the great majority of cases, however, this is not necessary, as the owner realizes that these improvements greatly enhance the value of his property, and that proper rat-proofing is an investment which is not liable to deterioration. Occasionally the owner, rather than concrete the full floor area of his building, will invoke the aid of the courts and procure an injunction restraining the board from further action. The case then enters a long legal phase, regardless of the menace to the health of the community. Insanitary shacks, the makeshift abodes of the reconstruction period, have been either put in good condition or forced from the city limits. Several failures on the part of the representatives of the board of public works to correctly interpret and enforce the building laws of the supervisors compelled the sanitary inspectors for a time practically to take over this part of the city's work also. Maps were prepared, showing the progress of new buildings with reference to their compliance with the ordinance which required concrete over the entire floor area.

Notwithstanding the many difficulties encountered and the disastrous delays of court procedure, a large number of permanent improvements have been made and many parts of the city have been securely fortified against disease.

The crusade against rats has been systematically conducted with success throughout the year. It was found early in the work that by the intelligent use of traps and poisons, the rat population could be lowered to a safe minimum, yet the species can not be entirely destroyed by such means. If, however, these measures can be supplemented by an attack upon the habitations and food supply at the same time, the number may be reduced almost to a negligible quantity in any community. The conclusion has been reached that rat-proof construction offers the only solution. In other words, the rat must be built out of our cities by the use of concrete, brick, and stone in the foundations and side walls of all buildings. Following is a summary of these operations:

DESTRUCTION OF RATS. (SAN FRANCISCO.)

Poisons placed	4, 781, 135
Rats trapped	146, 809
Rats found dead	9, 250
Rats examined bacteriologically	93, 558

DESTRUCTION OF RAT REFUGE.

Yards torn up by owner	703
Basements torn up by owner	969
Passageways torn up by owner	770
Floors torn up by owner	712
Houses destroyed by owner	108
Shacks raised 18 inches above the ground	103
Premises condemned through board of health	846
Premises in which wood was piled off ground	2, 326
Premises in which scrap iron was piled off ground	3, 287
Rat holes stopped up	23, 086
Old sewers stopped up	1, 880
Rat harbors destroyed	29, 404

DESTRUCTION OF RAT FOOD.

Premises inspected	367, 925
Garbage cans installed	13, 853
Chicken yards in city (estimated)	7, 022
Chicken yards abandoned	2, 171
Chicken yards concreted (area in square feet, 9,850)	322
Chickens disposed of	2, 516
Pigeons disposed of	499
Screens procured	1, 726
Notices served	15, 346

Up to October 7, 1908, a bounty of 10 cents per rat was paid by the board of health for rats either caught by the trappers or brought in by outsiders. The citizens' health fund was also drawn upon and the expenditures charged to this one item amounted to more than \$12,000. As this measure did not seem to very greatly increase the catch, after the wave of excitement was over, it was discontinued.

In the last eighteen months there has been a remarkable diminution of fleas in San Francisco. This disappearance has been noted by both residents and nonresidents, but no one has as yet offered a satisfactory explanation of the phenomenon. It is believed that general cleanliness in house, yard, and cellar, the use of chlorinated lime in such places, together with the renovation of stables, has practically abated the flea nuisance in San Francisco. Another factor should be mentioned in this connection. The destruction of the rat and its harboring places has, no doubt, contributed largely to the general

effect. There are some who maintain that the extermination of the rat accounts entirely for the disappearance of the fleas.

The identification and study of the fleas found on rats, ground squirrels (*Citellus beecheyi*), and the other small mammals of this vicinity have been carried on in the laboratory. It has been shown that the five varieties of rat fleas and the two varieties of squirrel fleas, namely, the *Hoplopyllus anomalus* and the *Ceratophyllus acutus* very readily feed on man under experimental conditions. Squirrel fleas have been found infesting the rats of San Francisco. This fact is important when considered in relation to the present plague situation. There is at this time no plague infection in San Francisco, but in the near bay region (Contra Costa County), there is a widespread epizootic of plague among the ground squirrels. The rats of the city may be reinfected at any time through the medium of infected squirrel fleas.

Although more than 1,200 men were employed at various times in rat destruction, cleansing, disinfecting and laboratory work during the epidemic, not one was stricken with the disease. The immunity of those engaged in this dangerous occupation was due to the observance of routine precautionary measures. Federal employees were required to wear gloves and use antiseptic solutions while handling rats. A doctor, two nurses, and a morgue attendant contracted the disease at the City and County Hospital in the fall of 1907. The doctor and one of the nurses recovered.

INSPECTION OF SICK AND DEAD. (SAN FRANCISCO.)

Sick inspected (plague, none)-----	344
Dead inspected (plague, none)-----	5, 681
Necropsies held-----	96
Rats infected with <i>B. pestis</i> (1 taken from Depew warehouse, Third and Channel streets, July 25, 1908; 1 taken from Depew warehouse, Third and Channel streets, August 4, 1908; 1 taken from California warehouse, 631 Second street, October 21, 1908; 1 taken from California warehouse, 631 Second street, October 30, 1908)-----	4

CLEANING AND DISINFECTION. (SAN FRANCISCO.)

Vacant lots cleaned and disinfected-----	5, 712
Streets cleaned and disinfected-----	101
Buildings disinfected-----	4, 572
Plumbing nuisances abated-----	2, 066
General nuisances abated-----	48, 299
Loads of fire débris removed (estimated)-----	16, 060
Premises cleaned of rubbish-----	2, 302
Vessels inspected-----	1, 677

A movement having for its object the placing of a noninfectible zone between the residence section of the city and the water front is well under way. Sanitary measures directed toward the permanent exclusion of rats from the wharves and first tiers of business blocks will be pursued. Property owners have been prevailed upon to remedy structural defects and provide rat-impervious floors in the grain warehouses and produce stores therein. In addition, the state harbor commission has decided to erect only iron and stone piers for the accommodation of shipping in future. Three magnificent piers of this description have already been completed and are now being used by the steamship companies engaged in the oriental trade. When closed, these wharves are absolutely rat proof.

The following tables show the amount and character of the permanent work done in San Francisco.

OLD PREMISES.

	Concrete work done.	
	Number con- creted.	Area.
		<i>Square feet.</i>
Basements.....	944	1,888,000
Floors.....	173	910,717
Yards.....	216	142,953
Passageways.....	200	127,462
Sidewalks.....	200	501,791

NEW PREMISES.

Basements.....	838	2,565,370
Floors.....	252	324,430
Yards.....	200	59,879
Passageways.....	292	123,711
Sidewalks.....	861	682,956

Number of stables condemned and abandoned.....	645
Number of stables under construction.....	47
Stables rat-proofed by other methods than concreting.....	379
Action pending on stables.....	62

Improved health conditions as regards the incidence of typhoid fever, variola, and diphtheria are shown in the annual report of the local board of health.

The following statistics are taken from this report:

FISCAL YEAR 1907-8.

	Cases.	Deaths.
Typhoid fever.....	363	107
Smallpox.....	298	4
Diphtheria.....	664	90

FISCAL YEAR 1908-9.

Typhoid fever.....	267	68
Smallpox.....	134	1
Diphtheria.....	589	55

WORK OF THE FEDERAL LABORATORY.

The following excerpts are taken from the report of Passed Asst. Surg. George W. McCoy, bacteriologist of the San Francisco plague laboratory.

As was the case during the previous year, the great bulk of the laboratory work has consisted in the examination of rodents for plague infection.

Rats examined.....	93,558
Rats found plague infected.....	4
Ground squirrels examined.....	3,826
Ground squirrels found plague infected.....	42

Gophers examined -----	248
Rabbits examined -----	22
Moles examined -----	27
Weasels examined -----	2
Total -----	97,729

Since the last plague-infected rat was found, October 23, 1908, over 60,000 have been examined without finding any case of plague infection.

The ground squirrels examined have nearly all come from Contra Costa County during the month of June, 1909. As is shown in the table, 42 of these animals have been found to be infected.

The work reported in the last annual report with various biological products designed for use as rat exterminators has been continued. The results, however, have been rather unsatisfactory. None of the preparations that have been examined killed any large percentage of the rats to which they were fed.

A large number of experiments were carried out to determine the resistance of rats and other rodents to plague infection. It was found that San Francisco rats were only moderately susceptible; field mice were also moderately susceptible; gophers had a high degree of immunity, and ground squirrels were found to be very susceptible.

Flea determinations have been carried on in the laboratory throughout the year. The seasonal prevalence of these parasites is at present under investigation, and it is hoped that in due time some definite statement may be made on this subject. It was demonstrated that all of the common rat fleas would readily bite man under experimental conditions, as would the squirrel fleas.

Observations have been made on the subject of rat leprosy, and two apparently new points have been brought out in connection with this disease. First, that the majority of the cases are rather intimately associated with the meat industry; and, second, the very interesting observation was made that a large percentage of the leprosy rats are the subjects of a well-marked nephritis. The tumors of rats have been made the subject of considerable study. It has been found that they correspond in a general way with the growths found in the human species, but on the whole appear to be somewhat less malignant.

Experiments have been conducted with a view to determining how long rats would live without water and with certain limited dietaries. It was found that if an abundant supply of food was provided the rodents would live many days without water. One, indeed, lived something over a month. If a mixed diet (without water), such as bread and meat, with or without vegetables, is provided the animals will remain in perfect health apparently indefinitely.

A number of physicians have visited the laboratory for the purpose of becoming familiar with the lesions of plague in rodents and with the elementary features of the bacteriology of the disease.

Formal demonstrations of plague have been arranged for the students of the Medical College of the University of California, for the class in hygiene of the Leland Stanford Junior University, for the class at Hahnemann College, for the Association of Health Officers of the State of California, and for the San Francisco County Medical Society. These demonstrations have been well attended, and those

for whom they were arranged have stated that they derived great benefit from them.

An exhibit illustrating the various lesions of plague in rodents and other points in the pathology of rodents was prepared for the Alaska-Yukon-Pacific Exposition at Seattle. The officers of the service have availed themselves of the facilities offered by the laboratory for taking a short course in bacteriology and pathology.

BANQUET IN CELEBRATION OF SUCCESSFUL PLAGUE CAMPAIGN.

On March 31, 1909, the citizens' health committee of San Francisco, in celebration of the success attending the work of plague eradication and in honor of Passed Asst. Surg. Rupert Blue, as representative of the service, tendered to him a banquet, which was attended by some 300 representative citizens. Doctor Blue was presented with a gold watch by the mayor of the city on behalf of the citizens' health committee, and each of the federal officers was presented with a medal.

The campaign had illustrated what can be accomplished by harmonious cooperation between the national, state, and municipal authorities, backed up by a patriotic public sentiment, such as had been exhibited in San Francisco.

ANTIPLAGUE OPERATIONS IN OAKLAND, CAL.

The work in Oakland has been continued as in the past, although on a somewhat smaller scale. A laboratory has been maintained and a small force of rat catchers has furnished several hundred rodents each week for examination.

The city board of health, through Mayor Mott, succeeded in getting a small monthly appropriation from the council. The salaries of seven sanitary inspectors were paid from this amount.

SUMMARY OF OPERATIONS (OAKLAND).

Sick inspected	170
Dead inspected	1,453
Necropsies held	65
Cases positive for plague (sickened July 17, 1908)	1
Premises inspected	32,095
Nuisances abated	5,917
Garbage cans installed	3,279
Places rat proofed	53
Ships inspected	82
Ships fumigated	26
Premises cleaned	4,289
Notices served	698
Rats found dead	1,014
Rats trapped	24,875
Rats identified (<i>Mus norvegicus</i> , 14,295; <i>Mus rattus</i> , 96; <i>Mus musculus</i> , 1,133; <i>Mus alexandrinus</i> , 71)	15,595
Ground squirrels caught	18
Rats examined bacteriologically	16,575
Rats infected with <i>B. pestis</i> (1, No. 708 Webster street (Chinatown), trapped October 30, 1908; 1, No. 319 Fourth street, between Harrison and Webster, trapped December 1, 1908)	2
Ground squirrels examined bacteriologically (negative)	18
Poisons placed	401,350

On account of the contiguity of Contra Costa County, which is badly infected with squirrel plague, it is considered that Oakland and the other cities on the eastern shore of the bay should be kept under careful sanitary supervision. Special attention should be paid to garbage collection and destruction, preferably by incineration.

The present method, that of hauling the garbage out to sea and there discharging it, is to be mentioned only to be condemned. During the past year considerable trouble has been experienced from this source, as the garbage when discharged at an insufficient distance from the shore would be washed onto the beaches, there to breed flies and sustain rats. In fact, for a time Bolinas Beach on the north and Baker's Beach at San Francisco were temporarily ruined in this manner.

ANTIPLAGUE OPERATIONS IN CONTRA COSTA COUNTY, CAL.

Two human deaths from bubonic plague in July, 1908, in Contra Costa County emphasized what has long been the opinion of those who have studied the problem, the fact that this was an enzootic focus for the disease.

For several years human deaths from plague have been a matter of annual occurrence in Contra Costa County, and it has been known that for at least the past four years some epizootic has been spreading among the ground squirrels of that region. In all probability this disease was bubonic plague, but this could not be determined until the summer and autumn of 1908, when the investigations following two human cases resulted in the discovery of four plague-infected squirrels. Three of these squirrels were shot and one was found dead. All were discovered within 4 miles of Baypoint, Cal. One of these was found on the ranch where a boy died of bubonic plague in the summer of 1908; the others were secured near the coast of Suisun Bay. These findings removed the question of squirrel plague from the field of theory to that of fact. It remained, however, to prove the extent of the infection, and to evolve, if possible, a plan for the final eradication of the disease. In April, 1909, Doctor Blue was given an allotment for the beginning of such a campaign. This has been carried forward with great vigor under the immediate direction of Passed Asst. Surg. W. C. Rucker. The problem has proved a serious one. The infection is found to cover a wide area; in fact, no portion of the county, some 744 square miles, seems to be free from the infection. Infected squirrels have also been found in Alameda County, to the south. Experiments have been made with the various poisonous agents to be used in the destruction of ground squirrels, but it has been found impracticable to carry on an eradication campaign at the present time, for the reason that the abundance of food at this time of the year makes the squirrel unwilling to take poisoned wheat, and the dry and cracked condition of the ground renders it impossible to use the various gaseous agents which give the best success in the work. For the present the work consists in securing squirrels for the purpose of laboratory examination, in order to determine the extent and percentage of the infection. For this purpose hunters are stationed in various parts of the county. They shoot on an average 2,500 squirrels per week, which are forwarded to the service plague laboratory in San Francisco in sealed metal cans. Here the carcasses are subjected to careful pathological and bacterio-

logical examination. The state board of health and the county board of supervisors are cooperating in every way. It is hoped when the rainy season approaches a campaign of public education may be launched, to the end that every person living in the county will cooperate in the destruction of squirrels. If the agents to be used in the destruction of ground squirrels are issued to the ranchers gratis, it is believed there will be no difficulty in securing their aid. Without this the extermination of the squirrels will be almost impossible without prohibitive expense.

This campaign is directed at the eradication of what would otherwise be a permanent focus for plague in America, and the constant menace not only to San Francisco and the bay cities and the State of California, but also to the entire nation. The fact that ground squirrels are frequently utilized for food, and are carried into the bay cities for eating purposes, doubles the chances of introducing plague into the cities. This practice has, in a measure, been stopped through the efforts of Doctor Blue and the state board of health, but it is impossible to prevent private hunters from shooting and eating these animals. Some time will be required to complete the work in Contra Costa County. Specimens will also be taken from the various contiguous counties with a view to determining whether or not infection has spread to them.

SUMMARY OF OPERATIONS (CONTRA COSTA COUNTY).

Sick inspected	2
Dead inspected	56
Necropsies held	6
Cases positive for plague (1 sickened July 11, 1908; 1 sickened July 21, 1908)	2
Ranches inspected	1, 080
Ranches poisoned	217
Ground squirrels received	4, 177
Ground squirrels examined bacteriologically	3, 826
Ground squirrels infected with <i>B. pestis</i>	42

The above figures are for Contra Costa County for the fiscal year ended June 30, 1909. Since that date operations have been extended so that to November 1, in Contra Costa and other counties, the number of ranches inspected has been 4,511; squirrels destroyed have numbered 44,843, of which number 298 have been found infected. It will be necessary to continue this work for an indefinite period until all this plague infection has been eliminated.

ANTIPLAGUE OPERATIONS IN POINT RICHMOND, CAL.

The intelligent course pursued by the citizens of Point Richmond in guarding against infection is an example of what a progressive community can do in an emergency. Sanitary inspectors were employed and a garbage incinerator installed early in the year. Four rat catchers were employed and paid by the Federal Government.

SUMMARY OF OPERATIONS (POINT RICHMOND).

Sick inspected (plague, none)	34
Dead inspected (plague, none)	45
Premises inspected	18, 207
Nuisances abated	1, 031
Rats found dead	731
Rats trapped	1, 365
Rats examined bacteriologically	1, 082
Poisons placed	464, 050

ANTIPLAGUE OPERATIONS IN ALAMEDA COUNTY, CAL. (EXCLUSIVE OF OAKLAND.)

The work in Alameda County, outside of the city of Oakland, consisted in a joint inspection of the dead by federal and state inspectors and the performance of necropsies when a doubt existed as to the cause of death in any case.

Antiquated methods of disposal of garbage and refuse are still employed in the cities of Alameda and Berkeley. In fact, rat destruction and other precautionary measures have been entirely neglected.

SUMMARY OF OPERATIONS.

Sick inspected (plague, none) -----	226
Dead inspected (plague, none) -----	1, 937
Necropsies held -----	98

ANTIPLAGUE OPERATIONS IN LOS ANGELES, CAL.

As reported by Surgeon S. D. Brooks in August, 1908, a single case of bubonic plague occurred in Los Angeles, and shortly after one ground squirrel, found dead in the same vicinity, was proven to be infected with this disease.

On September 8, after the positive proofs of the diagnosis were obtained, the health department of Los Angeles insisted that the mayor and council should recognize the existence of a case of plague and authorize means to protect the city.

Authority was given to construct and equip a suitable plague laboratory, and an addition of 18 men only was allowed to the force of the health department to catch and poison rodents and enforce the cleaning of certain sections of the city. At the same time request was made by the mayor, seconded by the California state board of health, that the Surgeon-General of the Public Health and Marine-Hospital Service detail a bacteriologist to carry out the work in the proposed plague laboratory.

With this meager equipment of men the health officer did vigorous work. Mice and fleas were found in the house where a boy lay sick and were exterminated. The region immediately surrounding the house and along the Southern Pacific Company's railroad tracks and the railroad warehouses and the meat packing establishments in the neighboring section of the city were made the earliest points of attack. This section was raided again and again for rodents and to enforce temporarily at least as great a degree of cleanliness as was possible. The work was extended along the railroad tracks to the city limits, where it was taken up by the county health officer, Dr. O. R. Stafford. This was the earliest plan of the campaign—to use every effort to ascertain if infected ground squirrels, rats, mice, or other rodents existed in the section of the city noted and along the Southern Pacific Company's tracks as far north in Los Angeles County as the mountains. Then the remainder of the city of Los Angeles, which embraces 61.40 square miles, was slowly covered. The population is now over 300,000.

In September, 1908, the state board of health appointed Dr. I. R. Bancroft (and later his successor, Dr. W. H. Fox, after Doctor Bancroft became an assistant health officer of Los Angeles) to examine

into the cause of all deaths in Los Angeles County and to perform necropsies in all suspicious cases. Many necropsies were performed, but no case suspicious of plague was found. This special service was discontinued May 1, 1909.

The laboratory of the Medical College of the University of Southern California was used temporarily for the rodent examinations, and about September 23, after the arrival of Passed Asst. Surg. A. M. Stimson, of the Public Health and Marine-Hospital Service, the specially constructed laboratory was available, and the work was carried on faithfully by that officer as long as the appropriation by the city council was continued—that is, until April 12, 1909—during which time 13,922 animals were examined. Of this number of animals, 4,722 were ground squirrels, 8,288 were gray rats, 564 were black rats, 125 were gambel pocket rats, 96 were mice, 69 were white rats, 32 were rabbits, 23 were gophers, 2 were skunks, and 1 a wild rat.

Of the total number of animals examined during the period above stated none was found infected with plague.

Upon this favorable showing, the necessity for the further detail of an officer at Los Angeles not being apparent, he was withdrawn shortly after April 12, 1909.

Health Officer Powers realized that he was not exterminating the rats nor the ground squirrels in the city, and that it never could be done with so small a force of men, nor without an ordinance looking to the rat proofing of basements, stables, etc. But all his efforts in this direction were unavailing. As time passed and no further cases of plague occurred, the opposition to further expenditures increased and all possible future dangers to the city were forgotten.

The total cost to the city of Los Angeles was \$10,573.26.

Following the discovery of the case of plague in Los Angeles, measures were instituted for the destruction of rats and ground squirrels in the county of Los Angeles adjoining the city, and in the cities and towns of Pasadena, South Pasadena, San Pedro, Long Beach, Alhambra, Hollywood, Glendale, Banning, Monrovia, Sierra Madre, and other places, and also at the Pacific Branch National Home for Disabled Volunteer Soldiers. This warfare was pushed with considerable vigor at first, and in many places the ground-squirrel population seemed to be practically wiped out, but with the disappearance of apprehension of a spread of the disease, efforts were relaxed or discontinued, and it appears that the rats and squirrels are once more numerous. As a rule, no accurate record was kept of the number of rodents destroyed. The health officer of the city of Pasadena states that the campaign at that point is still on and will be continued. In that city and in the county of Los Angeles the warfare seems to have been the most active.

The use of poisoned grain was found to be the most effective means for the destruction of the squirrels.

ATTITUDE OF THE STATE AND LOCAL HEALTH AUTHORITIES.

The state and local health officials have cooperated to the full extent of their appropriations. They were the legal source of authority in the prosecution of the campaign and deserve the highest commendation for delegating such powers to the federal officers. The state board of health, through its president and secretary, was par-

ticularly fortunate in securing the passage of a law declaring it the duty of all persons to exterminate rats, mice, and ground squirrels on property owned, leased, or occupied by them, and providing a penalty for the violation of the same. Reprints of this act have been distributed throughout Contra Costa County and in other parts of the State liable to become infected.

In California, as in other States, where the service has been called to undertake sanitary problems of great magnitude, the principal obstacle to success has been the lack of sanitary laws, both State and municipal, which might be brought to bear on the situation. These difficulties have been met and overcome in each case. Suitable state laws have been enacted and municipal ordinances secured which enabled the service to fulfill the humane purposes of its organization.

ANTIPLAGUE OPERATIONS IN SEATTLE, WASH.

By way of introduction it may be stated that three verified human cases of bubonic plague drew the attention of local, state, and federal health authorities to the existence of the disease in Seattle in the latter months of 1907. A vigorous sanitary campaign was organized by Passed Asst. Surg. L. E. Cofer, of the United States Public Health and Marine-Hospital Service, which work, with the exception of the fumigation of ships and the bacteriological examination, was taken over by the municipal department of health on January 22, 1908, and is now being carried on by the city commissioner of health, J. E. Crichton. Passed Asst. Surg. M. W. Glover reports that no human cases have occurred since the inauguration of this work. Five plague-infected rats were verified from different parts of the city during the fall and early winter. Six cases of rat plague were verified during the spring of 1908, five being from within an area of some six blocks in length in the business section along the water front and one rat from the city garbage dump about a mile to the south.

DIFFICULTIES OF ANTIPLAGUE WORK.

Seattle is confronted by certain special difficulties in its antiplague work. Owing to the newness and rapid growth of the city, the cheapness of timber, and the high price of labor, lumber is extensively used for building purposes, and even the wholesale business district is largely built up with wooden structures. Back of the wharves are the railroad tracks, streets and buildings resting upon piles high in the air above the water and a tide-washed shore line covered with rubbish. In many of these buildings is carried on a wholesale business in grain, meat, vegetables, and other edible products. Along the water front to the south the brush bulkheads harbor countless droves of rats, and although this section is less densely built up, yet these rats manage to find a subsistence about stables, markets, etc. An incinerator, built since the outbreak of plague, has accomplished much toward solving the garbage problem. It is, however, inadequate for taking care of the entire accumulation and the city is still depositing about 70 tons of garbage per day upon dumps. These dumps of course support the usual rat population. Following the

finding of the plague-infected rats in the spring of 1908, a large amount of work was done, filling in underneath the streets and buildings of the infected area, thus covering the rubbish. The work was very effective in reducing the rat population of the district.

The routine work carried on by the local health authorities during the present year may be summarized under the following heads—inspection, poisoning of rats, and trapping of rats. The routine work of the officers of the United States Public Health and Marine-Hospital Service may be summarized under the following heads—fumigation of ships, and bacteriological examination of suspected material.

WORK OF MUNICIPAL HEALTH DEPARTMENT.

The municipal department of health and sanitation maintains a corps of sanitary inspectors, to each of whom is assigned a district. Among other duties the inspector looks after the enforcement of the sanitary ordinances relative to keeping premises free of rubbish and the proper storage and disposal of garbage. As the first essential to the reduction of the rat population is the deprivation of the means of livelihood in respect to food supply and harborage, this phase of the work is regarded of fundamental importance.

The corps of poisoners is four in number. When responding to a complaint of rat infestation the poisoner's first duty is the inspection of the premises, as rats always mean uncleanly or insanitary conditions. If the conditions are found to be particularly bad the case is reported to the chief sanitary inspector and taken up from his office. If the defects are easily remediable the complainant is instructed as to the measures to be employed and as soon as nuisances have been abated the poison is placed. The abatement of nuisances and poisoning are uniformly effective in the residence districts. In the business section, for reasons above outlined, the measures which would be necessary to effect a complete and permanent eradication of rats are often not practicable. In such cases the poisoning is repeated periodically and the case is further taken up by the trappers, who install bait and look after the traps and deliver the catch at the laboratory.

There is a rat bounty of 10 cents, and many rats are procured by this means, chiefly from districts where they most abound, notably the brush bulkhead and garbage dump areas. The department of health also maintains a corps of six trappers who devote their attention for the most part to the business section.

Business men along the water front unanimously testify to the radical change for the better in the matter of rat infestation since the inauguration of the antirat campaign, and these men are among the strongest supporters of the work.

Though it has been a considerable time since the finding of the last plague-infected rat, yet in view of the impossibility of absolute certainty as to the eradication of the disease, of the ever present danger of a fresh importation of plague from other infected ports, and of the economic advantages accruing from the work it is the policy of the municipal department of health and sanitation, supported by an effective public sentiment, to continue the antirat crusade.

PRECAUTIONS ON SHIPS.

In order to prevent the spread of plague by sea-borne commerce, all ships were made to breast off from the dock and all lines were protected with rat guards. Alaskan boats were fumigated monthly, intrastate boats were inspected semimonthly for evidences of rats and fumigated as often as such evidences were found. Fumigation was performed by the burning of sulphur in the holds, galley, store-room, fore-castle, etc. The dead rats recovered after fumigation were taken to the laboratory for bacteriological examination. The fumigation of ships was carried on under the direction of Passed Asst. Surg. M. W. Glover, of the United States Public Health and Marine-Hospital Service, until March 13, 1909, when, owing to the length of time which had elapsed since the finding of plague, it was discontinued by bureau order. From the beginning of the fiscal year to the date of the discontinuance of this work 380 vessels were inspected and 154 vessels were fumigated.

The work of the plague laboratory was carried on during the fiscal year by Asst. Surg. C. W. Chapin and comprised the examination for evidences of plague of rats delivered by the bounty men and city trappers, and the investigation of human suspects reported from time to time. The human suspects occurring in Seattle during the year were four in number—three being orientals—and were reported on account of sudden death or lack of clinical history. All these cases proved negative to examination for plague. During the year 51,750 rats were delivered at the laboratory and 48,652 were necropsied. Of these 7 were plague infected. The plague-infected rats were delivered at the laboratory on the following dates: July 6, 2 rats; July 9, 4 rats; and September 26, 1 rat. In addition verification was completed of 3 rats, 1 delivered on June 23 and 2 delivered on June 29, 1908.

The above-mentioned plague-infected rat of June 23 was delivered from the woodyard premises, Eighth avenue and Madison street. This woodyard comprises the greater portion of the block, is located some eight blocks up the hill from the infected water-front district, and contains, besides the woodyard, a small stable from which the infected rat was obtained. As soon as verification was complete the stable was ordered vacated, everything movable was removed, the building was surrounded by a sheet of galvanized iron to prevent the escape of rats, the floors were taken up, and 53 rats killed and found dead, were sent to the laboratory. Altogether 9 rats delivered from this stable from June 23 to July 9, inclusive, were found to be plague infected. After the removal of the floors and rubbish the ground was saturated with a solution of bichloride of mercury. The building was left vacant several days, during which time guinea pigs and rats from the laboratory were kept caged in the building to test its safety. These animals remained free from disease.

The feed used in this stable had been obtained from the Spokane Grain Company, a wholesale house situated in the 1200 block on Western avenue within the infected water-front district. It was supposed that the infection had reached the stable by this route, but the examination of rats from these premises yielded only negative results until September 26, 1908, when the last plague-infected rat was brought from the premises of the Spokane Grain Company.

SCIENTIFIC RESEARCH AND SANITATION.

In accordance with legal authority and in response to demands made upon it, the bureau, through its Division of Scientific Research and various laboratories, has actively engaged during the year in investigations of contagious and infectious diseases and matters pertaining to the public health. The public-health problems for investigation have been selected in most instances with the view to rendering the results immediately applicable in practical sanitary administration. So far as problems are concerned, they are more extensive than can be taken up in any one year. There are many questions of a public-health character requiring laboratory investigation, and a still greater number of unsolved problems in the domain of the sanitary sciences which can only be solved by continued research in the laboratory and in the field.

It has been the endeavor to properly equip the several laboratories and to maintain them in such a state of efficiency as to facilitate the investigations in hand. There have been some additions to the force of scientific workers, and as this branch of the service grows it becomes more apparent that the success of research work will in future depend upon specializing and the development of recognized experts in special lines. A wise administrative policy will foster this procedure so far as the exigencies of the service will permit, and its fulfillment will result in great additional usefulness and credit to the public-health service. This policy is now being pursued, 37 officers having been afforded the facilities of the Hygienic Laboratory for purposes of instruction. In addition, officers of the service are now devoting special attention to the management of plague and yellow-fever outbreaks; the medical inspection of aliens and study of the diseases to which they are especially liable; studies of morbidity and mortality statistics; investigations of pellagra, typhoid fever, plague, yellow fever, rabies, tuberculosis, hookworm disease, and leprosy. Through such specializing different officers of the corps have become proficient along the several lines, and it is expected that officers who enter the service in future will be given this opportunity in so far as is possible.

Investigations begun in previous years have been continued, with the result that some of them have been completed, while others are still in progress. The reports of these investigations, with full details, have been prepared for publication as Hygienic Laboratory bulletins, public-health papers, and special articles in the public-health reports.

As in previous years, the service has been represented at the meetings of the more important scientific and sanitary associations, and the officers thus detailed have in most instances contributed articles relating to scientific research and practical sanitation. Through such association with health authorities and other scientific workers, the bureau has kept in touch with the advances made in preventive medicine.

Upon the request of state and local health authorities, the bureau has cooperated with said authorities so far as possible in public-health investigations. For this purpose the facilities of the Hygienic Laboratory have been utilized. As an instance of this may be mentioned the cooperation with the Florida state board of health. Upon request of the state health officer of Florida, there have been made in the Hygienic Laboratory daily and routine examinations of specimens upon the diagnosis of such diseases as typhoid fever and malaria. In addition, samples of water have been examined and reports made thereon. Laboratory assistance of this character can be properly rendered, and the association of the service laboratories with the health organizations of the country is of mutual advantage and should be extended.

The laboratories now in operation are the Hygienic Laboratory in Washington, the leprosy investigation laboratory in Hawaii, and the federal plague laboratories in San Francisco and Seattle, as well as small clinical laboratories at the Marine Hospital Sanatorium, Fort Stanton, N. Mex., and certain of the marine hospitals. At most of these stations research work is being carried on. It is expected that the laboratory in San Francisco will be continued and enlarged, as there will be demand for such work in relation to plague among rodents for an indefinite period. The leprosy investigation station is being devoted to the solution of the special problems of leprosy in the Hawaiian Islands, and during these investigations studies will be made of allied problems relating to the public health.

There is necessity for a research laboratory on the Gulf coast for the investigation of tropical diseases, including malaria, yellow fever, and hookworm disease, and the study of culicides, germicides, and agents for the destruction of rodents. A research laboratory should also be established in the region of the Great Lakes for the study of problems in relation to interstate sanitation, such as the prevention of the pollution of streams and the prevention of the transmission of typhoid fever, tuberculosis, and other communicable diseases by vessels and trains. It is also desirable that a research laboratory be established in New York, in which to investigate the problems arising through immigration and in order to utilize the large amount of clinical material in the study of communicable diseases.

These additional laboratories could be established and maintained at small cost at the existing marine hospitals, and could be manned by officers who have had the course of instruction in the Hygienic Laboratory and are specially qualified for such duty. Their administration through the Division of Scientific Research would prevent duplication and secure cooperation in the scientific study of public-health problems affecting all parts of the country.

The operations of the bureau through the Division of Scientific Research and Sanitation, with supplemental work in the laboratories and in the field, have included the following: Supervision over the manufacture and sale of viruses, serums, toxins, and analogous products; investigations of vaccine virus; investigation of the reported occurrence of apthous fever; investigations of typhoid fever in the District of Columbia and Forest Glen, Md.; investigations of pellagra and the publication of literature relating thereto; investigations of rabies and treatment in the Hygienic Laboratory of persons bitten by rabid animals; studies on tuberculosis and the fostering of

colored antituberculosis leagues; investigations of hookworm disease and certain problems on American farms; investigations of amœbi-asis; investigations of leprosy at the leprosy investigation station, and an inquiry into the present status of leprosy in the United States; analyses of drugs, water, and other public-health investigations in the Hygienic Laboratory; studies in relation to the pharmacopœia in the Hygienic Laboratory; studies of milk and its relation to the public health; studies of the rat and its relation to the public health; the preparation of an exhibit for the Alaska-Yukon-Pacific Exposition; cooperation with other departments of the Government; the preparation and publication of scientific and practical public-health bulletins; conferences with the advisory board of the Hygienic Laboratory and state and territorial health authorities; and work in relation to international sanitation.

VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS.

Administrative supervision has been maintained over the manufacture and sale of viruses, serums, and toxins during the year as provided for in the act approved July 1, 1902. Twenty-one establishments were licensed by the department during the year, 10 of them being foreign.

Samples of the products of licensed establishments have been purchased in the open market from time to time, examined as to purity and potency, and with very few exceptions found satisfactory. Where lack of purity or loss of potency were detected, immediate steps were taken and the faulty conditions responsible corrected.

The good effects of the above-mentioned law have been previously mentioned, and they are shown in the high quality and therapeutic efficiency of the biologic products now offered in the market.

Through inspections close supervision has been had over the various establishments, and their products in the main have been satisfactory. The manufacturers have cheerfully cooperated with the Government in the enforcement of this law, oftentimes at considerable expense. This attitude is commendable and necessary, for the maximum benefits of the law will depend largely upon mutual cooperation and confidence.

The following is a list of the establishments licensed during the fiscal year:

ESTABLISHMENTS LICENSED.

No. of license.	Establishment.	Products.
1	Parke, Davis & Co., Detroit, Mich.....	Antidiphtheric serum, antitetanic serum, anti-streptococcic serum, antigenococcic serum, erysipelas and prodigious toxins (Coley), tuberculins, bacterial vaccines, and vaccine virus.
2	H. K. Mulford Co., Philadelphia, Pa.....	Antidiphtheric serum, antitetanic serum, anti-streptococcic serum, antipneumonic serum, antigenococcic serum, antidyenteric serum, tuberculins, bacterial vaccines, and vaccine virus.
3	Dr. H. M. Alexander & Co., Marietta, Pa....	Antidiphtheric serum, antirabic virus, vaccine virus, and tuberculins.
5	Fluid Vaccine Co., Milwaukee, Wis.....	Vaccine virus.
8	Cutter Analytic Laboratory, Berkeley, Cal....	Antidiphtheric serum, antistreptococcic serum, antityphoid serum, tuberculin, and vaccine virus.

ESTABLISHMENTS LICENSED—Continued.

No. of license.	Establishment.	Products.
9	Frederick Stearns & Co., Detroit, Mich.....	Antidiphtheric serum, streptolytic serum, pneumolytic serum.
11	Pasteur Institute of Paris, Paris, France.....	Antidiphtheric serum, antistreptococcic serum, antiplague serum, antidyenteric serum, antimeningococcic serum, and serum antivenimeux.
12	Chemische Fabrik auf Actien (vorm. E. Schering), Berlin, Germany.	Antidiphtheric serum and antistreptococcic serum.
14	Health department of the city of New York..	Antidiphtheric serum.
15	W. R. Hubbert Serum Laboratory, Detroit, Mich.	Do.
16	National Vaccine and Antitoxin Institute, Washington, D. C.	Antidiphtheric serum, antigonococcic vaccine, vaccine virus, and normal horse serum.
17	Lederle Antitoxin Laboratories, New York City.	Antidiphtheric serum, antitetanic serum, tuberculins, bacterial vaccines, vaccine virus, antistreptococcic serum, and suspension of lactic acid bacilli.
18	Burroughs, Wellcome & Co., London, England.	Antidiphtheric serum, antistreptococcic serum, antistaphylococcic serum, antityphoid serum, antistreptococcic vaccine, antistaphylococcic vaccine, antigonococcic vaccine, and antityphoid vaccine.
19	Memorial Institute for Infectious Diseases, Chicago, Ill.	Antidiphtheric serum.
21	Swiss Serum and Vaccine Institute, Berne, Switzerland:	Antidyenteric serum, antipneumococcic serum, antimeningococcic serum, antiplague serum, antistreptococcic serum, anticholera vaccine, antiplague vaccine, antityphoid vaccine, and tuberculins.
22	Institut Bacteriologique de Lyon, Lyons, France.	Antidiphtheric serum and normal goat serum.
24	Farbwerke, vormals Meister Lucius & Bruning, Hoechst-on-Main, Germany.	Antidiphtheric serum, antistreptococcic serum, antidyenteric serum, and tuberculins.
25	Tuberculin Society of St. Petersburg, St. Petersburg, Russia.	Tuberculinum purum.
26	Institut de Vaccine Animale, Paris, France...	Vaccine virus.
27	Institut Pasteur de Lille, Lille, France.....	Serum antivenimeux.
28	Bacteriologisches Institut Lingner, Dresden, Germany.	Pyocyanase.

ANTIDIPHThERIC SERUM.

The standard unit for measuring the strength of antidiphtheric serum was promulgated April 1, 1905. The essential facts concerning the adoption of this standard have been related in previous reports, and the technical investigations in the Hygienic Laboratory necessary in its preparation have been made the subject of a special bulletin.

The standard unit for antidiphtheric serum was prepared and sent out from the Hygienic Laboratory at the usual bimonthly periods. The use of this standard has now quite replaced in the United States that of the serum furnished by the Royal Institute in Frankfurt, Germany.

A large number of samples of antidiphtheric serum and antitoxic globulin solutions from licensed manufacturers were examined in the Hygienic Laboratory during the year, as well as a number of samples from establishments desiring to be licensed. Although an increased number of samples were examined as compared with previous years, the number of those below strength was very few. Some manufacturers, in the endeavor to obtain a high potency globulin solution, have probably increased the total solids to a point which hinders the absorption of the solution.

The secretary of the state board of health of Ohio communicated with the bureau March 18, 1909, respecting a complaint made to him

of the antitoxin furnished by his board, and forwarded specimens of diphtheria antitoxin of the same laboratory number for examination in the hygienic laboratory. He also forwarded, on March 30, replies to inquiries made of physicians throughout the State who had used this antitoxin. In all 32 reports, the original complaints included, were received. Of these, 28 reported satisfactory results from the use of the antitoxin, with no unfavorable symptoms. The physician making the original complaint reported the appearance at the point of injection of a dark-blue spot sometimes as large as a saucer. A second physician reported some discoloration and complaint of pain and swelling. A third reported the appearance of a small dark-blue spot around the puncture. A fourth reported considerable swelling, with pain on pressure, in two cases.

In a report of April 6, 1909, the Director of the Hygienic Laboratory stated that a determination of the total solids in one sample of the serum in question was made in the Division of Pharmacology, and that the total solids were 21.05 per cent, of which 0.65 per cent was nonconsumable ash. He also stated that the total solids in normal horse serum are about 9.7 per cent, and that the total solids of the sample examined were therefore two and one-half times that ordinarily found in horse serum. The high percentage of total solids noted probably hindered absorption, thereby causing induration at the site of inoculation.

The secretary of the state board of health of Ohio was informed of the results of examination of the serums forwarded by him.

In a letter dated April 9, 1909, all establishments licensed for the propagation and sale of diphtheria antitoxin were also informed of the presence of high total solids, and that the matter was brought to their attention as it seemed advisable to avoid overconcentration of diphtheria antitoxin and other serums which may bring about untoward local symptoms and loss of therapeutic efficiency.

On account of the importance of this question in relation to the administration of the law of July 1, 1902, correspondence relating thereto was forwarded to the Director of the Hygienic Laboratory, and in a letter of May 15 his attention was invited to the importance of investigating this problem in connection with other examinations of serum.

ANTITETANIC SERUM.

As a result of the adoption by the department of a standard unit for measuring antitetanic serum, this product now being offered for sale in interstate traffic by the several establishments is uniform as to potency.

The standard has proved in actual practice to be satisfactory, accurate, and permanent. It has been recognized by the Governments of Belgium and Brazil, and it is hoped that it will be generally adopted, and incorporated in the forthcoming revision of the United States Pharmacopœia. The standard tetanus toxin prepared in the Hygienic Laboratory is sent out on demand from that institution.

One of the most important results of the adoption of the official standard for the measurement of the strength of antitetanic serum will be that physicians, by using a definite number of units for prophylactic and therapeutic purposes, will gradually collect available data as to the number of units necessary for prophylactic use and for

use in cases of developed tetanus. There are at present no reliable data upon this question, and it is important that physicians in using antitetanic serum and reporting cases of tetanus should state the number of units administered.

INVESTIGATIONS OF VACCINE VIRUS.

In the latter part of November, 1908, there was brought to the attention of this bureau by Dr. John R. Mohler, Chief of the Pathological Division, Bureau of Animal Industry, an account of an outbreak of foot-and-mouth disease in Pennsylvania and other places. He stated that the origin of the outbreak had been traced to Michigan, and that there was suspicion that the disease had originated in connection with the manufacture of vaccine virus in the establishment of Parke, Davis & Co., Detroit, Mich.

On account of the suspected relationship of the outbreak of foot-and-mouth disease to the manufacture of vaccine virus, Surg. M. J. Rosenau was ordered, on November 28, 1908, to inspect the establishment of Parke, Davis & Co., in accordance with the law of July 1, 1902, regulating the manufacture and sale of viruses, serums, and toxins in interstate traffic and in conformity with the regulations promulgated thereunder under date of February 21, 1903. This inspection was made in company with Doctor Mohler, and Surgeon Rosenau, in his report dated December 22, 1908, stated in effect that the first cases of foot-and-mouth disease discovered were brought from the stock yards at East Buffalo, N. Y., to two points in Pennsylvania, and that the diagnosis was made by the state veterinarian and confirmed by the Chief of the Bureau of Animal Industry and his assistants November 11, 1908.

An attempt at this time to trace the origin of the cases was unsatisfactory, although it was determined that the infected animals had come from Clare, Mich. Subsequently, however, the prevalence of a mild type of foot-and-mouth disease was reported on several farms in Wayne County, Mich., and among the animals infected were 21 heifers which had previously been used by Parke, Davis & Co., of Detroit, for the production of vaccine lymph. It was observed by officers of the Bureau of Animal Industry that these animals were in the fourth stage of the disease; in other words, the lesions were older and more nearly healed than those found in any other center where the infection had been observed.

With these facts in mind, and with the knowledge of a previous outbreak of foot-and-mouth disease having been attributed to vaccinated cattle in New England, it was necessary to trace the movements of the 21 cattle above referred to.

The investigations showed that these animals were rented by Parke, Davis & Co., as was the custom, vaccinated on September 23 and October 6, and returned to the owners October 16. On this date the animals were driven to the Detroit stock yards, watered and fed, and then taken to Elm, Mich., and dispersed. The appearance of foot-and-mouth disease was observed on October 18 by the purchaser of 10 of these animals, and by other purchasers about the same time.

All subsequent foci of infection were directly or indirectly traced to the 21 vaccinated animals, while negative results followed the investigation of the places whence these cattle came before they were

taken to the vaccine establishment in Detroit. The probability of the infection of these animals during vaccination was thus indicated, and rendered necessary a searching investigation of the method of manufacture and preservation of vaccine virus, including the origin of the strains of virus used and the care and disposition of the animals used for vaccination purposes. A careful inspection of the biological laboratories was therefore made, and on December 1 the records of the particular vaccines and cattle used during the months of September and October were secured. In addition the employees of Parke, Davis & Co., directly connected either in a supervisory or minor capacity with the production of vaccine virus, were placed under oath by Inspector Rosenau, in accordance with the act of Congress approved July 1, 1902, and the testimony thus obtained, together with records submitted, were made a part of the report of inspection. This report contained the following conclusion as to the origin of the infection of foot-and-mouth disease under investigation:

The only conclusion which seemed warranted was that the earliest cases of foot-and-mouth disease in the present outbreak occurred in 21 vaccinated animals of Parke, Davis & Co., and that the original source of infection was traceable to Parke, Davis & Co.'s establishment and to no other point. Whether the infection originated in the vaccine virus used upon these calves or whether the animals were exposed to the infection by coming in contact with foreign material which carried the contagion is now the subject of investigation * * * which will be the subject of a supplemental report.

Upon receipt of the inspector's report it was placed before the bureau sanitary board for consideration. This board confirmed the recommendations made in the report, to the effect that more space should be provided in the pathological department of the above-mentioned establishment in order to permit the safe conduct of vaccine and other work; that refuse, crude materials, and goods of miscellaneous origin should not be permitted in or about the vaccine stables or the animals used for the propagation of vaccine virus; that all vaccine virus manufactured by Parke, Davis & Co. since October 1, 1908, should under no circumstances enter into interstate traffic until the investigations referred to in the inspector's report were concluded; that animals used for propagating vaccine virus should be under daily veterinary inspection for not less than ten days immediately before they are vaccinated; that an autopsy should be made on each vaccinated animal immediately after taking the virus, and permanent records kept of the autopsy findings.

In accordance with these and subsequent recommendations, and in accordance with the regulations promulgated under the act of July 1, 1902, Parke, Davis & Co. were notified of the faulty conditions observed in order that they might take steps to correct the same. In the meantime their license for the manufacture and sale of vaccine virus, which had expired November 22, 1908, had not been renewed, and the same was withheld pending the conclusion of investigations of their stock vaccines and correction of faults necessary to the safe production of vaccine virus.

In order to determine whether the requirements of the department had been complied with, the establishment of the above-mentioned firm was reinspected by Surgeon Rosenau in accordance with orders dated February 2, 1909. This inspection included a complete survey of the methods, materials, and employees concerned in the propaga-

tion, packing, and preparing of vaccine virus for the market. It was the opinion of the inspector that the establishment had taken and would take necessary steps to improve their methods for the propagation of safe vaccine virus.

In the meantime the laboratory investigations of stock vaccine virus secured by Surgeon Rosenau during his first inspection had been continued, and on March 5, 1909, he reported that specimens of this virus had been shown by Doctor Mohler and himself, together and independently, to contain the virus of foot-and-mouth disease.

During the inspections referred to above, information was received that the only vaccine virus used by Parke, Davis & Co., outside of their regular strains, was some manufactured by the H. K. Mulford Company, and purchased on the open market for purposes of comparative tests. Samples of the vaccine virus of this latter firm were therefore secured and examined in the Hygienic Laboratory, and in his report of March 5, referred to above, the director stated that this vaccine was found to contain the virus of foot-and-mouth disease.

It was recognized that immediate action was necessary, first, to prevent the transmission of foot-and-mouth disease to humans through the agency of vaccine virus, and second, to prevent the further propagation of contaminated vaccine virus in establishments licensed in accordance with the law of July 1, 1902, regulating the manufacture and sale of viruses, serums, and toxins.

The license of the H. K. Mulford Company for the manufacture and sale in interstate traffic of vaccine virus was therefore suspended March 9, 1909, and the company was advised that any contaminated vaccine virus manufactured by them and offered for sale in the open market should not be sold for purposes of vaccination, but be withdrawn from the market.

The license of Parke, Davis & Co. had been withheld since November 22, 1908, and they had been warned against the sale of any vaccine virus made by them since October 1, 1908. In addition, all virus manufactured by them from May 1, 1908, to February 1, 1909, was packed under government seal by the inspector, awaiting absolute proof as to its purity.

In accordance with order dated March 10, 1909, all licensed establishments in the United States were reinspected for the purpose of giving information that certain vaccine virus was contaminated with foot-and-mouth disease; to determine whether said establishments were propagating contaminated vaccine virus; to obtain samples of vaccine virus of each strain used for examination; and to give instructions in methods of detecting contamination and its prevention.

Immediately upon suspension of their license, the H. K. Mulford Company discontinued the propagation and sale of vaccine virus. They took prompt action, recalling all vaccine virus from jobbers, retailers, and health departments by telegram, and at once took steps to destroy all virus and infection in their establishment in order to make a clean start.

In his report of inspection made in accordance with instructions of March 10, Surgeon Rosenau reported that the propagating barns, the laboratories, the ice box, etc., had all been cleansed and disinfected, and that the H. K. Mulford Company proposed building at once a quarantine barn in which to keep calves under observation during the period of detention preliminary to vaccination.

In order to determine the thoroughness of withdrawal of presumably contaminated vaccine virus from the market, letters were addressed to officers of the service stationed at twelve cities throughout the country instructing them to purchase on the open market original packages of vaccine virus.

All reports received from these officers stated that no vaccine virus manufactured by the H. K. Mulford Company was being sold, that it had been recalled by that company, and that original packages could not be purchased.

In order to determine the extent of the contamination of vaccine virus, extensive investigations of samples were undertaken in the Hygienic Laboratory. Necessary calves were purchased, and in order to take all precautions against the spread of infection, provision was made for the erection of pens in which to house them. On account of the importance of these investigations, it was deemed advisable to submit them to the advisory board of the Hygienic Laboratory for consultation regarding the methods of conducting them. A meeting of this board had previously been called for March 26, 1909. During the conference it was stated by the Surgeon-General that as every precaution had been taken to prevent the transmission of foot-and-mouth disease through contaminated vaccine virus, it was now necessary to secure seed virus of absolute purity for purposes of propagation; that to this end investigations were being made, that they would be continued in the future, and that it was on this point particularly that the advice of the board was desired.

It was the consensus of opinion that routine investigations of vaccine virus should be continued, and that said testing should especially have to do with supervision of the use of new strains of virus for seed purposes.

The investigations of stock vaccines from Parke, Davis & Co. and The H. K. Mulford Company having been completed, and these establishments having been again inspected, it was determined that they had complied with the law and regulations regulating the manufacture and sale of vaccine virus, and that all of the presumably contaminated vaccine virus had been destroyed under the supervision of the inspectors. The license of the former firm was, therefore, renewed April 15, 1909, and the suspension of the license of the latter firm was removed on the same date.

Examinations were also made in the Hygienic Laboratory of the vaccine virus propagated by all other licensed establishments. The report of these examinations, April 12, 1909, stated that the virus tested upon calves in the laboratory for the infection of foot-and-mouth disease showed the samples to be free from this infection.

With the view to effectually controlling the importation and sale in interstate traffic of vaccine virus, it was deemed necessary to revise and amend the regulations authorized in section 4 of the act approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes." Revised regulations were therefore prepared and issued May 11, 1909.

In a letter of June 16, 1909, Dr. Eugene H. Porter, commissioner of health of New York, reported the occurrence of two cases of tetanus following vaccination in the village of Peekskill, N. Y. He

stated that upward of 21 children had been vaccinated with one lot of lymph during the month of May and early in June, and that on account of the untoward results reported the remainder of the vaccine used by the physician and the remaining packages of the same lot of vaccine in the hands of the local druggist were turned over to the department of health June 14 and tests were being made in the state antitoxin laboratory of this vaccine for the presence of tetanus organisms. Inasmuch, however, as the Treasury Department is charged with the supervision of vaccine virus and like products, Doctor Porter reported the existence of the cases above mentioned and offered to forward specimens of the vaccine in question for investigation.

On account of the importance of determining the origin of infection of the above-mentioned cases, and particularly as to whether the vaccine virus used had contained tetanus organisms, Passed Asst. Surg. John F. Anderson on June 21, 1909, was directed to proceed to Albany, N. Y., and other places to investigate the subject. As a result of these investigations Doctor Anderson reported that both cases of tetanus were in children and in the practice of a physician in Peekskill. Both children had been vaccinated from glycerinated lymph, the laboratory number of which was 19x, and the date of expiration June 20, 1909. Between 21 and 25 children had been vaccinated with this same virus in May and June, as above stated.

Doctor Anderson secured all of the remaining shields, intended for the protection of vaccination wounds, in the hands of the local druggist. He also secured some of the vaccine virus of the same laboratory number, and this, together with some of the same furnished by the state board of health, was subjected to bacteriological examination to determine the presence or absence of tetanus spores. During his investigations he inspected the laboratory records of the establishment which had manufactured the vaccine virus and found that independent tests for the tetanus bacillus had been made by two qualified experts and were entirely negative for tetanus spores. All of the vaccine virus obtained by Doctor Anderson was subsequently examined in the Hygienic Laboratory, also with negative results for tetanus spores. In addition a number of the shields were examined with negative results. Doctor Anderson, in his final report, made August 20, stated that Dr. H. D. Pease, director of the New York state laboratories, informed him that all of his results were also negative. The investigations made showed conclusively that the cases of tetanus reported were not due to the presence of tetanus spores in the vaccine virus used.

REVISED REGULATIONS FOR THE SALE AND IMPORTATION OF VIRUSES,
SERUMS, TOXINS, AND ANALOGOUS PRODUCTS.

TREASURY DEPARTMENT,
Washington, D. C., May 11, 1909.

The following regulations have been prepared by the undersigned board of officers in accordance with the provisions of section 4 of an act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles,

and for other purposes;" they are hereby promulgated and will supersede the regulations issued February 21, 1903, and amendments thereto.

G. H. TORNEY,
Surgeon-General, U. S. Army.

P. M. RIXEY,
Surgeon-General, U. S. Navy.

WALTER WYMAN,
Surgeon-General, Public Health and Marine-Hospital Service.

Approved:

FRANKLIN MACVEAGH,
Secretary of the Treasury.

LICENSES.

ISSUE OF LICENSES.

1. Licenses shall be issued, suspended, and revoked by the Secretary of the Treasury, upon the recommendation of the Surgeon-General of the Public Health and Marine-Hospital Service.

2. Licenses shall be issued only after inspection of establishments and examination of the products for which license is desired.

3. When an establishment shall have been inspected and the products propagated therein examined in accordance with these regulations, the report of inspection and laboratory examination shall be passed upon by the sanitary board of the Public Health and Marine-Hospital Service. The said board shall present its findings to the Surgeon-General of the Public Health and Marine-Hospital Service, who shall review and forward same, together with his recommendations, to the Secretary of the Treasury for action.

4. The following form of license is prescribed:

LICENSE.

-----, 190
This is to certify that -----, of -----, State of -----, have complied with the terms of "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes;" that the establishment of the said ----- has been duly inspected in accordance with regulations made under the terms of the said act, and that the said ----- are hereby authorized to engage in the manufacture, barter, and sale of ----- for one year from this date, or until reinspection.

This license is issued in accordance with the regulations prepared under the above-mentioned act, and is subject to suspension or revocation when due cause therefor is shown.

[L. S.]

Secretary of the Treasury.

5. Licenses shall be good for one year from the date of issue (or until reinspection), and will not be reissued without such reinspection and laboratory examination; the report of inspection and laboratory examination to be passed upon by the sanitary board and the Surgeon-General of the Public Health and Marine-Hospital Service, in accordance with the provisions of paragraph 3. Inspections shall be made at least once a year.

INSPECTION OF ESTABLISHMENTS.

6. The inspection shall be made by an inspector or a board of inspectors detailed by the Secretary of the Treasury upon the recommendation of the Surgeon-General of the Public Health and Marine-Hospital Service.

7. The inspectors shall be commissioned medical officers of the Public Health and Marine-Hospital Service or chiefs of Division of the Hygienic Laboratory of the same service.

8. The visit of the inspectors shall be unannounced.

9. It shall be the duty of the inspectors to call first upon the head of the establishment or member of the firm, stating the object of their visit.

10. The inspectors shall examine all portions of the premises, appliances, stables, barns, warehouses, records, and the methods employed in actual operation.

11. The inspectors are authorized, when they consider it necessary, to interrogate the proprietor, members of the firm, and employees of the establishment under oath.

12. The inspectors shall investigate fully the methods of preparation, storing, dispensing, and other details in the manufacture and sale of serums, viruses, toxins, and analogous products.

13. The inspectors shall carefully examine into faulty construction or administration of establishments which would tend to impair the potency or purity of their products, and shall, if of sufficient importance, make special report regarding the same.

14. It shall be the duty of the inspectors to purchase in open market or, if they deem it advisable, themselves to obtain in the establishment samples of the products then manufactured, which samples shall be examined by the inspectors for purity and potency or forwarded to the Director of the Hygienic Laboratory for such examination.

15. It shall be the duty of the Director of the Hygienic Laboratory of the Public Health and Marine-Hospital Service to test samples sent him by inspectors for purity and potency, and the result of this examination shall be given to the inspectors, who shall give this report due weight in making their recommendations.

EXAMINATIONS OF VIRUSES, SERUMS, TOXINS, ETC.

16. The terms "virus, serum, toxin, and analogous products" shall include the following products and such others as may be designated by the Secretary of the Treasury from time to time: Antidiphtheric serum or diphtheria antitoxin, antitetanic serum or tetanus antitoxin, antistreptococcic serum, antistaphylococcic serum, anti-gonococcic serum, antipneumococcic serum or antipneumonic serum, antidysenteric serum, antituberculous serum, antipest serum, anticholera serum, streptolytic and pneumolytic serum, antimeningococcic serum, antiplague serum, erysipelas and prodigiosus toxins, tuberculins, emulsion tubercle bacilli, suspension of lactic acid bacilli, antityphoid serum, bacterial vaccines, normal horse serum, and vaccine virus.

17. Viruses, serums, toxins, and analogous products propagated in licensed establishments and offered for sale in the District of Colum-

bia, or in interstate traffic, shall be obtained from time to time in the open market and examined under the direction of the Surgeon-General of the Public Health and Marine-Hospital Service as to purity and potency and as to whether said products are properly labeled, as required by section 1 of the law.

18. Viruses, serums, toxins, and analogous products propagated in licensed establishments and imported from abroad will be detained by customs officers at ports of entry, pending examination by officers of the Public Health and Marine-Hospital Service as to purity and potency and as to whether said products are properly labeled as required by section 1 of the law.

19. Samples of the same laboratory numbers shall accompany each foreign importation of viruses, serums, toxins, and analogous products, and said samples will be forwarded by collectors of customs to the Surgeon-General of the Public Health and Marine-Hospital Service at Washington for examination.

20. Viruses, serums, toxins, and analogous products imported from foreign countries will be refused entry by collectors of customs unless propagated in an establishment holding an unsuspended and unrevoked license, or intended for examination precedent to obtaining a license.

21. The immunity unit for measuring the strength of diphtheria antitoxin shall be that established and distributed by the Public Health and Marine-Hospital Service.

22. The immunity unit for measuring the strength of tetanus antitoxin shall be ten times the least quantity of antitetanic serum necessary to save the life of a 350-gram guinea pig for ninety-six hours against the official test dose of a standard toxin furnished by the Hygienic Laboratory of the Public Health and Marine-Hospital Service.

23. Manufacturers placing on the market serums concentrated by Gibson's method or by any other method, or mixed serums made by mixing concentrated serum with ordinary antitoxic serum, shall be required to so label them.

24. Preliminary to taking vaccine material from vaccinated animals, said animals should be killed or otherwise rendered insensible to pain.

25. As soon as practicable after taking the vaccine virus, a necropsy shall be made upon each animal, and permanent records kept of each necropsy, in which particular reference shall be made of pathologic changes.

26. All vaccine material from any animal having a communicable disease, other than vaccinia, or suspected of having a communicable disease, shall be destroyed.

27. The practice of renting animals for the purpose of propagating vaccine virus and returning the animals to the market shall be discontinued.

28. Animals used for propagating vaccine virus must be under daily veterinary inspection for not less than seven days immediately before they are vaccinated. Only healthy animals free from communicable disease shall be used for this purpose.

29. The propagation and sale in interstate traffic of old-style dry "lymph" vaccine points shall be discontinued after January 1, 1910.

30. Each and every lot of vaccine virus shall be examined to determine its freedom from pathogenic micro-organisms, and a special examination must be made of each and every lot to determine the absence of tetanus; detailed and permanent records of these examinations shall be kept by the establishment propagating said virus.

31. Containers, grinding and mixing machines, filling apparatus, instruments, etc., that come in contact with vaccine material during the process of manufacture and preparation for the market, shall be sterilized before use by steam under pressure at a temperature of at least 120° C. for not less than thirty minutes, or subjected to dry heat at a temperature of at least 160° C. for not less than one hour. Materials that will not stand this degree of dry heat shall be sterilized by a process known to be capable of destroying tetanus spores.

32. Refuse, wastes, excelsior, packing materials such as hay, straw, cotton, etc., crude materials and goods of miscellaneous origin and unknown history shall not be stored or permitted in or about vaccination stables or where the animals used for propagating vaccine virus are kept.

SUSPENSION AND REVOCATION.

33. When faulty methods of preparation, faulty construction, or administration of establishments are observed during inspection, the inspector shall bring the same to the attention of the manufacturer, and shall forward a report of the conditions found, together with his recommendations, to the Surgeon-General.

34. When impurities or lack of potency of products, or improper labeling of same, shall be demonstrated by laboratory examination, these facts shall be reported to the Surgeon-General.

35. Should the faulty conditions discovered during inspection or laboratory examination be found upon review by the sanitary board and the Surgeon-General to be of sufficient importance, the Surgeon-General shall recommend to the Secretary of the Treasury that the license of the offending establishment be suspended. If the said faulty conditions are not corrected within sixty days after suspension, he shall recommend that the said license be revoked.

36. The facts of suspension and revocation of licenses, with causes therefor, may be published in a circular to be issued and signed by the Secretary of the Treasury.

CUSTOMS REGULATIONS REGARDING IMPORTATION OF VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS.

It will be observed that paragraphs 18, 19, and 20 of the foregoing regulations have for their object the control of the importation of viruses, serums, toxins, and analogous products, and these regulations provide not only for the supervision of products from licensed establishments, but the prevention of the importation of products from unlicensed establishments. These provisions were made necessary in order not only to exclude contaminated and low potency viruses, serums, and toxins propagated in licensed establishments, but in order to effectually control the importation of seed vaccines and other products intended for purposes of propagation in establishments in this country.

In order to insure the enforcement of the above provisions, there was issued by the Secretary of the Treasury, June 10, 1909, Treasury Decision No. 29828, to collectors and other officers of the customs, containing the following regulations for their information and guidance:

REGULATIONS.

1. Viruses, serums, toxins, and analogous products propagated in licensed establishments and imported from abroad shall be detained by customs officers at ports of entry pending examination by officers of the Public Health and Marine-Hospital Service as to purity and potency, and as to whether said products are properly labeled, as required by section 1 of the act above referred to.

2. Samples of the same laboratory numbers shall accompany each foreign importation of viruses, serums, toxins, and analogous products, and said samples shall be forwarded by collectors of customs to the Surgeon-General of the Public Health and Marine-Hospital Service at Washington for examination.

3. Viruses, serums, toxins, and analogous products imported from foreign countries shall be refused entry by collectors of customs unless propagated in an establishment holding an unsuspended and unrevoked license, or intended for examination precedent to obtaining a license. Collectors and other officers will be advised from time to time as to the establishments duly licensed in accordance with said act.

4. The term "viruses, serums, toxins, and analogous products" shall include the following and such other preparations as may be designated by the Secretary of the Treasury from time to time:

Antidiphtheric serum, or diphtheria antitoxin.

Antitetanic serum, or tetanus antitoxin.

Antistreptococcic serum.

Antistaphylococcic serum.

Antigonococcic serum.

Antipneumococcic serum, or antipneumonic serum.

Antidysenteric serum.

Antituberculous serum.

Antipest serum, or antiplague serum.

Streptolytic and pneumolytic serum.

Antimeningococcic serum.

Erysipelas and prodigiosus toxins.

Tuberculins.

Emulsion of tubercle bacilli.

Suspension of lactic-acid bacilli.

Antityphoid serum.

Bacterial vaccines.

Normal horse serum.

Vaccine virus.

INVESTIGATIONS OF TYPHOID FEVER IN THE DISTRICT OF COLUMBIA.

In the annual report for 1908, page 50, reference is made to investigations of typhoid fever which had been carried on by a board of officers appointed for that purpose in July, 1906. The personnel of the board was increased by the appointment of Passed Asst. Surg. J. F. Anderson, Assistant Director of the Hygienic Laboratory. These investigations were continued during the year 1908 and the results are contained in Hygienic Laboratory Bulletin No. 52.

The epidemiological studies during the entire investigation were made by the same officer in order that the results recorded from year to year would be comparable. An important feature of the work during the year 1908 has been an intensive study of 32 city blocks, having a population of 5,300, for the purpose of determining the extent of typhoid fever and whether the cases were all reported as such. A special search was also made for bacillus carriers among this portion of the population and the results obtained are set forth in the publication mentioned above.

The investigations are being continued this year along similar lines as during the previous three seasons, except that this year the studies will include all cases of typhoid fever occurring between January 1 and December 31, 1909. Special attention is also being given to the diagnosis of cases in order to determine what percentage of those reported as typhoid fever is correct. This corroboration is made by means of clinical studies as well as the making of Widal tests in the Hygienic Laboratory and the demonstration of the typhoid bacillus in the blood, urine, and feces of typhoid cases. A great many specimens of blood were examined in the laboratory for the presence of the typhoid bacillus with positive results in a certain percentage of cases. The laboratory examinations last year also included over 1,000 samples of feces from 993 supposed healthy persons in the city of Washington in an endeavor to determine the percentage of persons harboring the typhoid bacillus in their intestinal tracts. The typhoid organism was found in three instances, two of which were probably bacillus carriers. This proportion would mean approximately 600 such typhoid foci in the District of Columbia. These studies will be continued during the coming fiscal year, but with the view to examining in the Hygienic Laboratory the discharges from persons who have suffered from typhoid fever within the five years previous. It is hoped to examine about 1,000 such specimens in order to determine the percentage of chronic bacillus carriers and the dangers from this source in the District of Columbia. Finally, a special study is being made of the raw and filtered Potomac water in its relation to the typhoid bacillus.

It is pertinent here to review the results obtained during the three years' study of typhoid fever in the District of Columbia, and their bearing on the control of the disease here and elsewhere. The first report on the subject is contained in Hygienic Laboratory Bulletin No. 35.

FIRST YEAR'S STUDIES.

The studies during the first year (1906) included a sanitary survey of the Potomac watershed; an exhaustive epidemiological study of 866 cases of typhoid fever occurring in the District of Columbia between June 1 and October 31, 1906; daily chemical and bacteriological examinations of the water supply; a special study of the pumps, wells, and springs in the District and also of bottled waters sold in Washington; an inspection of the dairies and laboratory examinations of the milk supply; an inspection of the ice factories; chemical and bacteriological examinations of a number of samples of ice, as well as the water from which the ice was made; and the making of blood cultures, diazo and Widal reactions for practicing physicians in the District. The question of shellfish, salads, fruits, and other raw food products in relation to the disease was also studied. Further, special attention was directed to the communicability of the disease from person to person by direct and indirect contact. The relation of privies and sewers to wells was also investigated, and the question of flies and other insects as carriers of infection received attention. The bathing beach and public markets were inspected from time to time, and in the division of zoology many specimens of feces were examined in order to determine the possible relation of animal parasites to typhoid fever. As a result of that year's investigations it was shown

that 11.3 per cent of 747 cases were due to infected milk, 7.3 per cent to contact, and in addition it was shown that 15 per cent of the 866 cases were imported.

While no cases were traced to water from wells, the board realized that the shallow wells in the District were a menace to the public health, and recommendation was accordingly made to the Commissioners to close at least those shallow wells that on chemical and bacteriological examination showed evidence of pollution, and this was done.

Typhoid fever was regarded by the board as a contagious disease, and the importance of isolation and disinfection was emphasized. The insanitary conditions surrounding the manufacture and handling of ice were pointed out, and it was recommended that this product should be under the close sanitary control of the local health authority. Other recommendations were made looking to the improvement of the milk supply, the early diagnosis of the disease, and its general prophylaxis.

SECOND YEAR'S STUDIES.

The studies during the second year (1907) included epidemiological investigations of the disease during the typhoid-fever season; daily bacteriological examinations of the raw and filtered Potomac River water; and bacteriological and chemical examinations of many hundreds of samples of the Washington milk supply; laboratory tests to assist in the diagnosis of the disease; and examinations of specimens in the search for bacillus carriers.

As a result of its second year's studies, the board concluded that much of the typhoid fever in the District of Columbia is imported; that many cases in the District are contracted through contact with persons or with articles handled or soiled by persons in the febrile stage of the disease; that infected milk is one of the important known factors in the spread of the disease in the District of Columbia; that the filtered Potomac River water during the typhoid season of 1907 (May to September) was, according to present bacteriological standards, of good sanitary quality, and so far as could be ascertained, was not responsible for the spread of the infection.

The board accordingly recommended that all cases of typhoid fever and all cases of suspected typhoid fever should be treated as contagious and dangerous to the community with the view to their isolation, the placarding of houses, and the prompt disinfection of the discharges and the patient's bedding; that laboratory facilities should be provided free of cost to aid physicians in the early diagnosis of typhoid fever, and also to determine when persons who had had the disease were no longer a menace to the public health by discharging typhoid bacilli; that all milk not certified or inspected should be pasteurized under official surveillance, especially during the typhoid-fever season; that the enactment of a law prohibiting the handling or sale of milk or milk products in any dwelling or any structure so situated as to render the contamination of these products especially liable; that there should be enacted a law prohibiting the care of a case of typhoid fever in any house where food or beverages liable to convey the infection are sold or prepared for sale; and that in order to furnish a water supply of a satisfactory grade of purity

throughout the year additional storage reservoirs should be constructed, or a coagulant should be used during periods of high turbidity.

THIRD YEAR'S STUDIES.

The third year's studies (1908) included a continuation of the epidemiological investigations of the disease during the typhoid-fever season; bacteriological examinations of the raw and filtered Potomac River water; an intensive study in a selected district comprising 32 city blocks and containing 5,300 persons; a special search for bacillus carriers among 1,000 healthy persons and a study of the fly abundance in relation to the prevalence of typhoid fever in the District of Columbia.

SUMMARY OF THREE YEARS' STUDIES.

As a result of the three years' studies the board has shown that typhoid fever has a distinct seasonal prevalence, but that the rate during 1908 was lower than for any other year for which there is record. They found that practically every case of clinical typhoid fever found in Washington was reported to the health officer, which is in marked contrast to Koch's findings and investigations in Trier. On account of the fact that some cases not typhoid fever are reported as such, the board expressed the belief that there should be official confirmation of the diagnosis of all cases of typhoid fever and of all cases suspected of being typhoid fever, since this would greatly aid in the suppression of the disease.

It was found that the disease was especially prevalent among children, suggesting that milk and contact are responsible for more cases than can be definitely traced to these factors. It was shown that Washington is a true endemic center, as the majority of cases occurred among persons who had not been absent from the city within thirty days previous to onset of illness, and some of them had lived in Washington all their lives.

It was found that the majority of the cases occur among persons who live in houses of good or fairly good sanitary condition, and that there is little difference in the prevalence of the disease in the sewered and in the nonsewered districts. No definite relation could be made out between the seasonal curve and fly abundance, and no evidence was found to support the supposition that day servants frequently convey infection to the households of their employers.

The three years' studies proved that "contact" is one of the major factors in the spread of the disease in Washington at the present time. The examinations of excreta from 1,000 healthy persons indicated that the typhoid bacillus is more commonly distributed among persons than actually clinically recognized cases of the disease would suggest.

It was shown that about 10 per cent of the cases studied during the three years were definitely attributed to infected milk, and this fact led the board to the conclusion that if all the market milk of Washington were pasteurized under official supervision the amount of typhoid fever would be materially reduced.

It was found that according to the accepted bacteriological standards, the filtered Potomac River water during the seasons of 1907

and 1908 was of good sanitary quality, and the conclusion was drawn that it does not seem probable that such water could have been directly responsible for much, if any, of the infection. Attention was drawn to the fact, however, that the typhoid fever rate is still comparatively high for a city with no water-borne infection. In discussing the prophylaxis of typhoid fever in the District of Columbia, the board concluded that the disinfection of excreta of patients is frequently inefficient or neglected, and that there is need of legal control of typhoid-fever patients and typhoid-bacillus carriers.

Finally, the board expressed the positive conviction that a vigorous campaign against typhoid fever as a contagious disease and the adoption of measures that would prevent the spread of the infection in milk would eliminate the greater part of typhoid-fever infection from the District of Columbia.

The fourth report of the board will terminate its labors.

INVESTIGATION OF TYPHOID FEVER AT FOREST GLEN, MD.

During investigations into the origin and prevalence of typhoid fever in the District of Columbia the attention of the board was brought to an outbreak of the disease at the National Park Seminary, Forest Glen, Md.

In the latter part of March, 1909, several cases of typhoid fever reported in the District were found to be cases which had developed among the students at this seminary. As the students made frequent trips to Washington, there was some question as to whether the infection was contracted at the seminary or in Washington.

Upon request of the president of the seminary, approved by the state board of health, a special investigation was undertaken to determine the source of infection, with a view to measures to eradicate it.

Passed Asst. Surg. L. L. Lumsden visited the seminary on April 7, The number of persons then at the seminary was about 100, most of the 270 students having left about March 30 for the Easter holidays. To that date the authorities of the seminary had learned of the development among the students of 7 cases of typhoid fever. Some of these cases had developed among the students at the seminary and others among those who had gone to their homes in various parts of the country. Up to April 27 information had been received of about 20 cases among the persons who at the presumed time of infection were living at the seminary. The dates of definite onset of illness of the cases extended from March 19 to April 11.

The results of the investigation left no room for doubt that the infection had been contracted at the seminary and not in the District of Columbia. The bulk of the evidence pointed to one of two factors as being responsible for the outbreak: First, the local water supply; and second, bacillus carriers.

Doctor Lumsden reported that specimens of feces and urine from the 16 persons concerned in handling the food to which all the persons infected had been exposed were obtained and examined in the hygienic laboratory, but all were negative for the typhoid bacillus. Further, the explosive character of the outbreak was, under the excellent conditions of cleanliness maintained in the kitchen and dining room, against the view that the outbreak had been caused by a bacillus carrier. An inspection was made of the dairy farm supplying the sem-

inary with milk, but there was no evidence obtainable that the milk had transmitted the infection.

The water supply was obtained from two sources. Three bored wells, each about 90 feet in depth, supplied most of the water used for drinking. Bacteriologic examination of water from these wells showed it to be of good sanitary quality. The water used for bathing, for washing dishes, and by the girls frequently for brushing their teeth and sometimes for drinking was obtained from a creek which runs through the seminary grounds and has its source in a spring about half a mile above the intake of the seminary's supply. This stream was found by Doctor Lumsden to be highly polluted with human excreta. About 100 yards below the spring the sewage from a hospital, with about 30 to 40 persons, emptied directly into the stream. Besides this, some of the sewage from about 20 residences scattered along the watershed between the spring and the seminary's intake was no doubt washed or drained into the stream.

The physician in charge of the hospital, who was also physician to the seminary, stated that there had been no cases suspected to be typhoid fever in the hospital. In one of the houses on the watershed, however, there had been a man ill of typhoid fever in February. His excreta, after treatment with copper sulphate—probably not sufficient to thoroughly disinfect them—were thrown out into the yard. This yard is on the crest of a hill separating the watershed of the stream in question from that of another stream. It could be readily seen that some of the excreta from this patient might have been washed by the heavy rains and melting snows, which occurred in February and the early part of March, down the hill a distance of about 500 yards to the stream supplying the seminary with water. Bacteriologic examinations of the water from the stream showed it to be highly polluted, the colon bacillus being invariably demonstrated in quantities of 0.1 c. c. Effort was made to isolate the typhoid bacillus from this water, but without success—which fact, under the circumstances, is evidence neither for nor against the organisms having been in the water at the time the infection of the persons occurred.

On March 30, on hearing of the outbreak, Doctor Lumsden had advised the seminary authorities to discontinue the use of the water from the suspected stream unless it was boiled, and to pasteurize all of the milk used in the seminary. After his inspection he made the following recommendations:

1. Immediate discontinuance of use of water from the suspected spring unless it could be previously boiled. Running boiling water through the distributing pipes to destroy any infection which might remain in the pipes. Abandoning the stream as a source of water supply and piping the water directly from the spring to the seminary.

2. Pasteurization of all milk used in the seminary.

3. Immediate isolation and thorough disinfection of the excreta of all persons becoming ill with symptoms suggesting the possibility of typhoid fever.

4. Examination of samples of urine of persons who had had typhoid fever to determine their freedom from infection before permitting the return of such persons to the seminary.

5. General recommendations as to the disposal of sewage and general sanitary conditions at the seminary.

6. The extension of the Easter holidays until April 27, so that the improvements could be made before the majority of the students returned.

Bacteriologic examinations for bacillus carriers among the cooks and helpers of the institution were made in the hygienic laboratory. On April 27, when Doctor Lumsden again visited the seminary, he found that the above recommendations had in a large part been carried out. As a result of these steps no further cases occurred, and the source of the infection was definitely attributed to the polluted water supply described above.

Information having been requested during the progress of this investigation, it was stated that conditions had been greatly improved. A copy of the report of the investigation was sent to the state board of health of Maryland for information and consideration.

POLLUTION OF INTERSTATE WATERS.

In the annual report for 1908, page 49, reference is made to the organization and plan of operations of the Lake Michigan Water Commission. The service was represented on this commission by Surg. G. B. Young, who served on the committee which had under consideration the control of shipping. The commission prepared and issued its first report, which contains much valuable information bearing on the character of Lake Michigan water. It is becoming more and more evident as a result of these and other studies that the time is rapidly approaching when legal measures will have to be adopted to prevent the further pollution of the water of the Great Lakes, which must in future be the source of the potable supply of a large population in that section of the country.

Not alone has the sewage pollution of Lake Michigan attracted attention, but Lake Erie is also becoming more and more polluted on account of the discharge of sewage of cities and towns located along its borders. This has been shown to be especially the case in the east end of the lake, and on this account there was organized in November, 1908, the Niagara Frontier Pure Water Conference, its chairman being Mr. W. M. Mills and its secretary Mr. W. H. Hoover. The conference represents towns such as Buffalo, Dunkirk, Lockport, Tonawanda, and Niagara Falls, drawing their water supplies from the Niagara River. The representatives in the conference were appointed by the mayors of the various cities, and these representatives also represent the boards of trade of those cities.

The object of this conference is to collect data and excite interest regarding the necessity of protecting their water supplies, which means the prevention of the further pollution of Lake Erie. The conference, however, recognized that the prevention of the pollution of these waters is incumbent on the National Government, as the problem is not only an interstate but an international one.

With the view to securing some definite action, a number of the members of the conference, in company with the Hon. Peter Porter, Member of Congress from the Niagara District, called at the bureau January 15, 1909. These gentlemen had previously visited the President, who referred them to the Surgeon-General. They pointed out that the Great Lakes must in future be the source of water supply of

more than one-fourth of the population of the United States; that these lakes are already polluted in certain places; that further pollution should be stopped, both from the standpoint of the public health and from the standpoint of abolishing nuisances. They stated that the geographical position of the cities at the outlet of the Great Lakes renders them especially liable to the dangers from sewage-polluted waters from other States. They reported that a great deal of the ice formed during the winter in close proximity to cities such as Dunkirk, Erie, and Cleveland, enters the Niagara River, and ultimately becomes lodged, thus further polluting the water supplies of the cities in the vicinity of the Niagara River. During this meeting it was explained by the Surgeon-General that this subject had received consideration, and that authority had been asked of Congress to make investigations of the pollution of interstate streams through a bill (No. 18792) which was then awaiting legislative action. The passage of this bill would have authorized the employment of a sanitary engineer and other necessary employees, whereby investigations of this important problem could have been undertaken. The bill was passed by the Senate and favorably reported to the House by the Committee on Interstate and Foreign Commerce, but failed to become a law. It is necessary that some definite action be taken looking not alone to the prevention of the pollution of the Great Lakes but other interstate streams in the interest of the country and of its interstate commerce. While both the legal and sanitary problems involved may be difficult, the pollution of interstate waters is a matter for federal intervention, and it would appear that it would be easier and cheaper to prevent such pollution than for the several States to engage in long and costly litigation after it has occurred.

For a further consideration of this matter, attention is invited to the section on water pollution in the brochure on "Public health problems of the nation," in the closing pages of this report.

INVESTIGATIONS OF PELLAGRA.

In 1908 there was prepared by Passed Asst. Surg. C. H. Lavinder, at the request of the bureau, a precis on pellagra. It was expected when this article was published that it would be the beginning of a very thorough investigation of the disease. Since the distribution of this paper much interest has been manifested in pellagra in many localities, and a relatively large number of cases have been reported from time to time.

In view of the increasing importance of pellagra from a public health standpoint, Doctor Lavinder was detailed for duty in the Hygienic Laboratory December 15, 1908, for the purpose of making special studies as to the cause, methods of transmission, and control of the disease. Pellagra has been the subject of most exhaustive study in certain parts of Europe, and the problem presents many difficulties, but in view of the somewhat different clinical picture presented in this country, it was recognized that the disease should receive immediate attention.

In a letter of February 17, 1909, from the Chief of the Bureau of Plant Industry, it was stated that the prevalence in southern Europe of pellagra is having considerable effect upon the marketing of American corn, as the disease is attributed to some injurious property

contained in moldy or so-called "spoiled" corn after it is ground into meal.

The increasing prevalence of the disease in the Gulf States was also mentioned, and it was suggested that because of the suspected relationship of corn to the disease that the matter should be investigated jointly by the Bureau of Plant Industry and the Bureau of Public Health, the Bureau of Plant Industry to undertake the investigation of corn with reference to its possible bearing on the development of pellagra, while the investigation of the etiological, clinical, epidemiological, pathological, bacteriological, and therapeutic aspects of the problem would devolve upon the Bureau of Public Health.

Cooperation of the character indicated is most beneficial, and the Chief of the Bureau of Plant Industry was therefore informed that special problems connected with the disease were being undertaken from a medical standpoint, and that he would be informed of any advances made.

INVESTIGATIONS IN VARIOUS LOCALITIES.

Cases of the disease having been reported at Columbia, S. C., Passed Assistant Surgeon Lavinder was detailed April 30, 1909, to proceed to that city for the purpose of making special studies, and he was provided with necessary laboratory apparatus and materials. An outline of the proposed investigations had been submitted to the advisory board of the Hygienic Laboratory on March 26, 1909. In a statement before that board, Doctor Lavinder referred to the different views held regarding the etiology of the disease. He also referred to reports indicating that there have been at least 1,200 cases of pellagra in the United States since 1907, and invited attention to the high mortality of the disease in this country and its apparently acute type as compared with cases in Europe.

Having outlined some of the problems to be investigated, particularly its periodicity in this country and abroad, it was the unanimous opinion of the board that investigations to be undertaken should begin in South Carolina and other places in this country, and that these should be made in order that Doctor Lavinder might be better prepared to make comparison with the disease abroad. It was in accordance with these views that the above-mentioned detail was made.

In accordance with this decision, Doctor Lavinder was sent to Columbia, S. C., April 30, 1909, and established his laboratory at the State Hospital for the Insane. This hospital contained a number of cases of the disease, and was considered a desirable institution in which to pursue investigations. The necessary material in this institution had been most courteously placed at the disposal of Doctor Lavinder by the South Carolina state board of health through Dr. C. F. Williams, the secretary; and the board of regents and superintendent of the asylum, Dr. J. W. Babcock, had cordially cooperated in the arrangement and evinced every desire to lend aid in such an investigation. Indeed the State of South Carolina has displayed great interest in the pellagra problem from the beginning, and has done much to stimulate interest in the grave situation which seemed developing in the Southern States.

Doctor Lavinder's studies at Columbia have been clinical, pathological, and bacteriological, full reports of which are expected to appear later in printed form. Briefly he reports that the cases conform in practically all respects to the descriptions of the disease as seen in Italy; that the mortality in institutions is very high, and that treatment of asylum cases has not given encouraging results. In his laboratory studies of the skin lesions, blood, spinal fluid, and excretions, his results have not differed from those reported by others. Exclusive of such intestinal parasites as hookworms, he has found thus far no infecting micro-organism by either microscopical, cultural, or animal methods. These preliminary investigations have, however, afforded him an excellent opportunity to familiarize himself with the disease from both the clinical and laboratory sides, and to get some idea of the magnitude and importance of the problems involved.

The disease has continued to spread to, or rather to be reported from other sections of the country. Early in July the bureau received reports from Nashville, Tenn., through Dr. J. A. Albright, secretary of the state board of health, and from Chicago, Ill., through Dr. W. A. Evans, commissioner of health, stating that pellagra was thought to exist in the former place in the Baptist Orphans' Home, and in the latter at the county asylum at Dunning, Ill. Both officers requested that some one be sent to confirm the diagnosis and give advice. Doctor Lavinder was ordered to these places, and left Columbia, S. C., on July 15. He found the disease existent in both places, about 15 cases at Nashville and 3 at Dunning. In both places it had existed for some time, and at Dunning 9 deaths had occurred within the previous year or year and a half.

Up to this time the disease had been reported from the Southern States only, but the corn belt had been watched with suspicion and anxiety for some time. It was a matter of much interest therefore to find the disease existent also in the North Central States. The situation at Nashville was somewhat peculiar and gave rise seriously for the first time in this country to the very old question as to the communicability of the disease. This is a matter, however, which has been considered thoroughly many times, and the disease by practically all authorities is considered not communicable.

Some time later, in August, the disease was reported to the bureau from the General Hospital for the Insane at Peoria, Ill., and request was made by the secretary of the state board of health and the superintendent of the asylum, Dr. George A. Zellner, for aid in confirming the diagnosis. Doctor Lavinder went to this place on August 13 and found a large number of well-marked cases in this institution. He reported that the disease, while different in some particulars from the southern type, nevertheless admitted of easy and positive diagnosis, and he commented on the fact that little corn and its products entered into the dietary of this institution.

The above facts serve to give some idea of the extent and prevalence of the disease in the United States. Exclusive of certain early sporadic cases, it was reported first in 1907, from the Mount Vernon Insane Asylum in Alabama (88 cases). This report was soon followed by similar ones from South Carolina, Georgia, and North Carolina, and later from many other States. In a recent publication by the service entitled: "The Prevalence of Pellagra in the United

States," by Lavinder, Williams, and Babcock, existing statistics are given, and it is shown, after careful inquiry, that there are records of about 1,000 cases scattered in 13 States. Since this date two or three other States have reported the disease.

It is highly probable, from existing evidence, that the disease has prevailed in the United States for some years unrecognized, but has for some reason become much more frequent and perhaps widespread within the last two or three years. As to its present prevalence and numbers there are no accurate data on which to base statements. Practically all reports of cases thus far have been made from insane asylums, and very conservative estimates of the total number of cases have increased from 1,000 to 1,500, and to finally 5,000. It is generally believed by most authorities that about 10 per cent of the pellagrous show sufficient mental involvement to be admitted to insane institutions, and on this basis in this country there would be, on a reported 1,000 cases in asylums, a total of 10,000 cases. At any rate, it is evident that the matter is becoming one of great importance; and, if we may judge by the experience of Italy and some other countries, it may certainly be questioned whether we are not confronted with another public-health problem destined perhaps to become of grave national importance. The situation has attracted, naturally, a great deal of popular interest, and the lay press has given it much attention.

EUROPEAN PELLAGRA.

Pellagra is a new disease in the United States, and the American medical profession is not all familiar with the subject. It is, however, a disease which has been known only too well in southern Europe, where for nearly two centuries it has been a burden and a tax on the physician, the sanitarian, and the public—a grave problem of national and international importance. Appearing first in Spain in 1735, it spread in a few years to France, Italy, Roumania, and other parts of southern Europe, and is now endemic in several parts of the world. Of recent years Roumania and Italy have been the greatest sufferers, and it is safe to say that each of these countries to-day has not less than 50,000 cases of the disease, about one-tenth of which are in insane asylums.

Professional talent of the highest order, important legislation, and large sums of money have been devoted to the solution of this problem, yet the disease still remains and advances, afflicting so many individuals through both its direct and hereditary influences as to prove the gravest menace to the integrity of many large communities.

ETIOLOGY.

The etiology of pellagra has received great attention at the hands of investigators, and the foreign literature on the subject is voluminous. The subject still attracts the ablest talents to its solution, and the literature continues to multiply, but with as yet no entirely satisfactory conclusions. There is, however, a very universal and profound conviction that the disease is in some definite way connected with the use of Indian corn, or its products, as an article of

food. This hypothesis is almost as old as the history of the disease itself, and has from time to time undergone much development and modification. Beginning with the now abandoned ideas that corn lacked certain necessary nutritive qualities, or perhaps contained certain harmful or toxic substances, it was reserved for Italian observers to bring out the view that not in good, sound corn, but in damaged or spoiled corn (corn which has undergone a change under bacterial influence with production of poisonous substances), must the cause of the disease be sought. Lombroso, one of the greatest authorities on the subject, after more than twenty-five years of experimental work and observation, stated the doctrine that has had the most profound effect. Succinctly stated, his hypothesis is that pellagra is the effect of an intoxication produced by poisons developed in spoiled corn through the action of certain micro-organisms, in themselves harmless to man. These micro-organisms, however, have never been satisfactorily identified, and the chemical poisons which they are credited with giving rise to have never been successfully and satisfactorily isolated and decided.

While practically all investigators take into consideration the harmfulness of spoiled corn, yet many students and workers have dissented from Lombroso's views. Some have thought the disease an auto-intoxication or an intestinal mycosis, while others have regarded it as a true infection either by molds or by bacteria. Several specific micro-organisms have been described only to be discredited by time and the work of other men. The most recent worker in this last field is Tizzoni, who has described a micro-organism isolated by him from the blood, stools, and organs of acute and chronic pellagrins, as well as from spoiled corn. This micro-organism he has called the *Streptobacillus pellagræ*. His work is of great interest, but too recent to be accepted without further confirmation.

Perhaps the most important work in the field of a specific infection in pellagra is that of Ceni. It is his idea that the disease is due to a specific infection by one of two molds, *Aspergillus fumigatus* and *A. flavescens*. His hypothesis is a most ingenious one, is supported by careful experimental work, and has attracted much attention. In the light of his views many obscure points seem at least to be capable of a possible, reasonable explanation. The essential points of his work and writings may be presented. In his opinion the disease in almost all cases is due to a true infection by the *Aspergilli* mentioned. He believes that these molds gain entrance, with food, to the intestinal tract, pass through the intestinal wall in the spore state, and localize in the lungs, pleuræ, pericardium, or pia mater. When localized they set up a true diffuse, inflammatory process, and elaborate very virulent toxins, which give rise to a characteristic general intoxication. Ceni has found several varieties of *Aspergilli* and *Penicillia* to possess pathogenic power and to be capable of producing characteristic toxins, but only the *Aspergillus fumigatus* and *A. flavescens* seem to have the power of infecting the human organism. All others must prove pathogenic by giving rise to absorbable toxins in the alimentary tract. The toxins produced by these various molds differ in different species and in different varieties of the same species; some producing toxins which give rise to depressive phenomena, such as general depression, with relaxation and diminution of muscular tone, while others produce toxins which give rise to exciting

symptoms, such as exaggerated reflexes, general tremor, and a spasmodic state of the muscular system. These two classes of symptoms are quite commonly observed in different types of pellagra.

Another important observation is the relation between the production of toxins and the season of the year. The greatest toxicity of the *Aspergillus fumigatus* and *A. flavescens*, for example, is said to occur in the spring and in the fall and correspond to the "cycle of the annual biological evolution" of these molds. And it is at these particular seasons that the grave and characteristic phenomena of pellagra are most evident in man. Molds isolated from unhygienic surroundings are found to be more pathogenic and toxic than others; and a fact of importance in the preparation of food by cooking is that these molds withstand quite high temperatures without impairment of virulence. Finally, as to the point of their relation to corn or its products, Ceni does not think corn a necessity for their infection of man, but he seems to think that molds grown on corn and eaten with the corn on which they grow means greatly increased virulence; and further that corn is probably the very general and usual means of their transmission to man.

As for other etiological views, they may be briefly dismissed. There is a small French school of students who deny that the disease is a morbid entity. They consider it a "*morbis miseriae*," and regard it as a syndrome which may occur in many cachectic states, particularly if associated with alcoholism. Sambon has made the interesting suggestion that the disease may be protozoal in its nature and insect borne, adding that the insect which acts as intermediary host may live around cornfields. Recently in a brief note, Smith and Hedges (Department of Agriculture) have suggested the possible connection with *diploдия* disease of corn. This fungus seems to be a soil infection and is difficult to eradicate from fields when once started there. It enters the plant by way of the root system and passes through stem and cob to the grain.

To sum up briefly, the belief that there is an etiological relation between pellagra and the use of corn as food would seem too universal to permit its rejection except in the case of demonstrative proof to the contrary. As to the exact nature of this relation there is much doubt, and this part of the problem must await further developments for its final solution. It would seem safe to say, however, that good, sound corn seems from all evidence to be a highly nutritious and very valuable cereal; and to counsel its total rejection would not only be inadvisable but probably foolish. Corn properly selected, cultivated, harvested, stored, milled, and transported, with proper means of preparation for food, seems to be innocuous, and the problem then may perhaps be resolved simply into proper oversight of methods applied to this valuable crop. It must be added, however, that suspicions have been expressed that flour and perhaps other foods may be adulterated with corn products. This would require investigation.

ITALIAN PREVENTIVE MEASURES.

In Italy, educating the people in proper methods of corn culture and preparation of it for food, improving general hygienic conditions, and inspecting imported grain, are said to be having a beneficial effect on the occurrence and control of the disease, although

pellagra statistics are claimed by some to be exceedingly untrustworthy.

The morbid anatomy of the disease is neither constant nor characteristic. The most essential and important feature is changes in the spinal cord; generally degenerations in the lateral columns in the cervical and dorsal regions.

The disease is of an endemic and epidemic nature and where once introduced is likely to remain for a long period of time. This, taken with the general belief in its etiological relation to the use of Indian corn has led Governments to institute elaborate organized prophylactic measures, involving the enactment of important legislation and the expenditure of much money. In the forefront of such work has been the Italian Government. Beginning with the establishment of a special hospital by Joseph II of Austria in 1784, and culminating in 1902 in the "Law for the prevention and cure of pellagra," many efforts have been made to stay the progress of or eradicate the malady. The Italian law of 1902 includes two classes or measures—curative and preventive. The curative measures include distribution of salt, administration of food at the patients' home or at sanitary stations (*locande sanitarie*), and treatment of such cases in special hospitals (*pellagrosari*); or in insane asylums. The prophylactic measures include inspection of imported corn and flour, exchange of good for bad corn, drying plants, cheap cooperative kitchens (*cucine economiche*), improvement of agricultural methods, and education of the people. As to the effect of such measures the results have not been as good as was anticipated, but the administration of the law has not been without criticism. A further experience will perhaps be necessary to determine its exact influence in controlling the disease.

While the general conditions in this country are quite different from those abroad, the whole subject is a matter of grave concern, both from public health and economic standpoints, and its earnest study is absolutely essential.

SERVICE COMMISSION TO INVESTIGATE PELLAGRA.

Since the close of the fiscal year a commission to investigate pellagra has been appointed with the approval of the Secretary of the Treasury, the personnel of which is as follows: Passed Asst. Surg. John F. Anderson (chairman), director of the Hygienic Laboratory; Dr. Reid Hunt, Chief Division of Pharmacology, Hygienic Laboratory; Surg. M. J. Rosenau; Passed Asst. Surg. C. H. Lavinder (secretary); Passed Asst. Surg. J. D. Long; Dr. Wm. A. White, Superintendent Government Hospital for the Insane; Dr. Nicolas Achuccaro, Government Hospital for the Insane.

INVESTIGATIONS OF RABIES.

There appeared in the annual report for 1908, page 55, an account of the investigations of rabies that had been made and those that were contemplated.

As previously stated, the legislative council of the American Medical Association, during a meeting held in Chicago, December 11, 1907, passed resolutions to the effect that the Public Health and Marine-Hospital Service should make investigations of rabies, with

the view to its prevention and control. It was determined to ascertain the geographical distribution of the disease in the United States at the present time. The year 1908 was selected, as it was thought that definite data could be secured. Communications were sent to state and territorial health authorities, local health authorities, United States Census Bureau, Pasteur institutes, and others who were known to be in a position to give definite data. The data received were compiled and prepared for publication as a public-health bulletin. As a result of these studies, it was determined that there were 111 deaths from rabies among human beings during 1908, and it was ascertained that there were at least 534 infected localities, as shown by reports of rabies among animals. It was shown that the disease prevailed over the eastern three-fourths of the United States, and that only from the Rocky Mountains and Pacific coast regions were no cases reported. In other words, 38 States and Territories and the District of Columbia were shown to be infected during the year. This widespread distribution of rabies indicates the necessity for the adoption of measures looking to its prevention. There are now over 20 Pasteur institutes in the United States prepared to administer prophylactic treatment.

PASTEUR TREATMENT.

The Pasteur treatment is also administered at the Hygienic Laboratory, 130 persons having been given the treatment there during the fiscal year 1909. All of these persons either had been bitten by dogs proven to have had rabies or had been in intimate contact with rabid animals. The preparation of the virus used in these treatments and for issue to state health authorities has occupied the greater part of the time of one officer. It is gratifying to state that no case of hydrophobia has developed among persons who have been given the treatment in the Hygienic Laboratory. One patient, however, on the eighteenth day of treatment developed acute paralysis of the hands and feet. The patient was attended by Passed Asst. Surg. H. M. Manning, who was then in charge of the work, and there has been marked improvement, which will end in recovery. Cases of paralysis, either during or following the course of the Pasteur treatment, occur in a very small percentage of cases. The cause of this paralysis has not been definitely worked out, but some writers attribute it to the rabies toxin, while others are inclined to attribute it to anaphylaxis. The subject is one for further study, with the view to its solution. There are also a number of other problems that demand scientific investigation, and it is expected that they will be studied in the laboratory during the coming year.

During the year materials for use in giving the Pasteur treatment were sent to the state boards of health of Alabama, Iowa, North Carolina, and South Carolina, and in addition to the Canal Zone. All of the virus sent from the laboratory was in the form of cords preserved in glycerin, it having been deemed inadvisable to send out as yet the emulsion ready for use.

The investigations of rabies, the preparation of antirabic virus, its administration in the Hygienic Laboratory and distribution to state and territorial health officers is an instance of the usefulness and practical nature of the work that the Hygienic Laboratory is equipped to carry out.

INVESTIGATIONS OF AMŒBIASIS.

In a communication of February 26, 1909, Surg. H. W. Austin, stationed at San Francisco, reported that during the past three years occasional cases of amœbic dysentery had been admitted to the marine hospital at that port, and that the frequency of such cases was increasing. On this account the routine microscopical examination of the stools of all patients having intestinal diseases had been practiced with the results of finding amœbæ in many cases as well as other intestinal parasites not commonly found in that locality.

In view of the importance of having an exact knowledge of the origin of the infection with amœbæ in its relation to the public health, he had an investigation made of all cases of dysentery in which amœbæ were found present in the stools to determine where they contracted the infection.

Accompanying the above communication was a report by Passed Assistant Surgeon Long, dated February 25, 1909, giving the results of the investigations of 20 cases, in all of which motile amœbæ had been demonstrated in the stools.

All of the patients had been closely questioned as to their movements, habits, and modes of life in order to determine if possible where the infection was obtained. As a result it was found that three contracted their infection in Manila, two in Hawaii, two in Central America, one in India, one in Tahiti, one in South America, and six in San Francisco.

Evidence was presented to show that the six cases had acquired the infection somewhere on the Pacific coast, and most probably in San Francisco or vicinity. One of these six cases had lived in San Francisco seven years prior to admission to hospital; one had lived in San Francisco six years, had never been in the Tropics, and had had symptoms for two years; one had lived in San Francisco twelve years, and had not been in the Tropics nor anywhere except Alaska and coast ports for seventeen years; one had lived in San Francisco three or four years and had had no symptoms until two months before admission to hospital; one had lived in San Francisco six and one-half years, and during that time had not been anywhere except to coast ports; and one had never been outside the State of California.

SOURCE OF THE INFECTION.

The report stated that the probable origin of these cases was not surprising in view of the fact that chemical analyses of the potable water of that vicinity had demonstrated the fact that the amounts of nitrogen present as nitrates and nitrites, chlorine, and organic matter (as shown by loss on ignition of total solids) were probably sufficient to furnish culture media for amœbæ.

It was also cited that the climate is not cold enough to seriously inhibit the growth of bacterial life, and hardly any of the watersheds were free from the danger of contamination of human beings.

Another more important factor is the practice of using human excreta for fertilizer on growing vegetables, as is done in China and Japan, many vegetable gardens being under the control of Chinese and others whose ideas of hygiene are vague, to say the least.

Doctor Austin recommended that further investigations be made to determine whether in other localities on the Pacific coast amœbic dysentery was present, and what preventive measures, if any, should be taken.

Although amœbic dysentery is associated with life in the Tropics, it undoubtedly prevails in the North Temperate Zone, as is evidenced by the above-mentioned report and other reports of cases from time to time.

In a letter of April 1, 1909, addressed to Surgeon Austin by the bureau, it was stated that a review of this subject and further investigations should be made, and that Passed Assistant Surgeon Long should undertake this duty, the report of the same to be published for the benefit of officers of the service and with the view to learning something of the geographical distribution of amœbiasis and the factors responsible for its propagation.

The investigations of amœbiasis made at the marine hospital at San Francisco during the fiscal year ended June 30, 1909, are a noteworthy feature of the work of that station.

It was found that of a total of 48 cases, including those previously referred to, suffering from amœbiasis, 15 had undoubtedly contracted the disease on the Pacific coast of the United States.

PREVENTIVE MEASURES.

On account of the dangers to the public health from this practice, Doctor Austin recommended to the health committee of the San Francisco County Medical Society that state legislation be secured making it a penal offense to use human excrement in the fertilization of vegetables. He addressed, also, a letter to the president of the San Francisco board of health, July 22, 1909, inviting attention to the dangers of the spread of amœbiasis, and suggesting that supervision over the gardens where vegetables are grown might be valuable in preventing further spread.

A meeting of the board of health was held August 4, 1909, to consider the matter, and Passed Assistant Surgeon Long was detailed to represent the service. His report of the meeting stated in effect that the subject of amœbiasis was discussed; that Dr. J. F. Watkins, city physician, reported that the sewer from the city jail at Ingleside did not connect with the city sewerage system, but emptied into a cesspool which was situated near vegetable gardens, the effluent from the cesspool being used to irrigate the vegetables, and that Acting Assistant Surgeon Wherry, who was present, reported that he had cultivated amœbæ from lettuce purchased in the open market, which organism could not be distinguished morphologically from *entomœba histolytica*.

As a result of the meeting, the following measures were decided upon:

1. Amœbic dysentery, or amœbiasis, to be declared an infectious disease, and all physicians and hospitals notified that cases coming to their knowledge must be reported to the board of health.

2. That a resolution be presented to the board of supervisors urgently requesting the extension of the jail sewer to the city sewer, and also urging that the construction of Islais Creek sewer be hastened as rapidly as possible.

3. The health officer was directed to prepare an ordinance to present to the board of supervisors, making the use of human excrement and sewage for the irrigation or fertilization of vegetables a misdemeanor.

4. That as soon as possible sanitary inspectors be appointed to investigate the condition of vegetable gardens.

5. That samples of vegetables be collected and sent to Acting Assistant Surgeon Wherry at the plague laboratory, Oakland, to determine whether or not amœbæ could be cultivated from them.

On account of the importance of the prevalence of amœbiasis on the Pacific coast and other parts of the country, it is expected to continue investigations of the disease at certain hospitals of the service to determine whether amœbæ can be found in the stools of patients suffering with intestinal and liver diseases, and to record and report on the antecedents of all cases of amœbiasis.

STUDIES ON TUBERCULOSIS.

During the past few years special studies have been made upon tuberculosis in the Hygienic Laboratory, principally in the Division of Pathology and Bacteriology. The thermal death point of the tubercle bacillus (60° C. for 20 minutes) has been determined with accuracy by the director. He has shown that so far as the viability of this organism is concerned, it does not differ widely from other nonspore-bearing organisms. The fact that the tubercle bacillus may be readily destroyed is important and will be helpful in preventive measures. A series of experiments were made by the director and assistant director of the laboratory upon the influence of the ingestion of dried tubercle bacilli, the results having been published in one of the current medical journals. Studies were also made by the assistant director on the occurrence of tubercle bacilli in market milk. He also made investigations with negative results to determine the presence of tubercle bacilli in the circulating blood of tuberculous patients. The experiments have been published in Hygienic Laboratory Bulletin 57, together with results of the studies of the director on the viability of the tubercle bacillus.

A number of government employees were examined at the laboratory in accordance with executive order of February 26, 1906, to determine whether or not they were suffering from tuberculosis. This work is a part of the general propaganda against tuberculosis, and forms one of the means of safeguarding government employees against this disease.

The service was adequately represented in the Sixth International Congress on Tuberculosis at Washington, September 28 to October 5, 1908, both in the administrative and scientific work and in the exhibit.

The operations of the Tuberculosis Sanatorium at Fort Stanton are detailed later in this report.

COLORED ANTITUBERCULOSIS LEAGUES.

On request of the president of the Georgia State College for Colored Youths, Surg. C. P. Wertenbaker was directed by the bureau to lecture before a negro farmers' conference at Savannah, Ga., Febru-

ary 25, 1909. During the lecture he suggested that as a means of preventing tuberculosis among the negroes there should be organized a state colored antituberculosis league. As a result such an organization was formed with Prof. R. R. Wright, president of the college, as president, and Dr. S. P. Lloyd, of Savannah, Ga., as secretary. The plan of organization suggested by Doctor Wertenbaker contemplated, in addition to the state league, local leagues in every negro church with a vice-president for each county in the State. By this means it was thought that any colored person might become a member of one of the branch leagues on the payment of a small annual due which would entitle him to a certificate of membership containing necessary information relative to the cause, prevention, and cure of tuberculosis, and the measures necessary to prevent its spread. It was expected that the fund formed by the annual dues paid by the members of each church league would be used for the care and treatment of members that had tuberculosis or developed it subsequently, and that this fund might also be used for disseminating information for combating the spread of the disease in a community.

The proposed plan met with general approval. In a report of progress, published in the Public Health Reports for August 6, 1909, Doctor Wertenbaker stated that there had been five state leagues organized and that great interest was being manifested by the negroes, health officers, and others in different parts of the country.

On account of the importance of the movement in the interest of the public health the proposed plan was submitted to the conference of state and territorial health officers with the Public Health and Marine-Hospital Service June 2, 1909. It was then explained to the conference by the Surgeon-General that, while the organization was not an official one, the bureau had made every effort to encourage its continuance, and the state and territorial health officers were requested to give it consideration with the view to lending their indorsement and support. As a result of this action, the conference of state and provincial boards of health, which met in Washington June 4 and 5, 1909, adopted the following resolution:

Whereas tuberculosis is specially prevalent among the colored people of the country, threatening not only their own race with decimation, but constituting a serious menace to the whites with whom they come in contact; and

Whereas the United States Public Health and Marine-Hospital Service has devised the best scheme yet suggested of meeting this problem by the organization of state colored antituberculosis leagues, with branch leagues in all colored churches: Be it

Resolved, That the conference indorses the plan of campaign and urges its members within whose jurisdiction it is a practical question to promote as far as possible its inauguration and success.

It is expected, therefore, that the leagues when organized will operate in conjunction with the state and local health authorities to their mutual benefit.

SERVICE ENCOURAGEMENT.

With the view to facilitating the organization of leagues and in order to obviate as much as possible the difficulties that arise in getting to work in an effective way, Surgeon Wertenbaker prepared a practical guide for the organization and operation of such leagues, and this was published in the Public Health Reports September 3,

1909. In connection with his other work he has, through correspondence, given all assistance possible to those interested in the movement and presented a great many lectures on the subject in different parts of the country.

It is known that tuberculosis is very prevalent among the negroes, nearly four times as many of them dying of the disease as white people. The suppression of the disease among the colored race has, therefore, become a serious problem, and it was recognized that this could be accomplished in no better way than through the church, which is an organization in which the negro is always interested, and with which a majority of them are connected. It was thought that by associating antituberculosis work with the church the negro would be apprised of not only his religious but his social needs, and that the league would become a club that could be presided over by the best educated and most intelligent members of the race. The plan of having a vice-president for each county provides a convenient and useful means of subdividing the work, and should insure greater activity throughout the States.

The affiliation of the antituberculosis movement with the church will serve to enlist the clergy in the cause of more improved conditions of living, and it must be said that in the past this powerful agency has not been utilized as it should have been either among the white or the negro race.

The plan provides for the rendering of financial aid by the negroes themselves to those of their race who are afflicted with tuberculosis, and thus becomes a potent factor in their social and sanitary betterment by teaching them self-reliance and giving them work to do in their own interest.

It is contemplated that the movement will extend to other States. It is organized on broad lines, and can be utilized by health officers and others wherever the problem for the suppression of tuberculosis among the negroes presents. Aside from its educational features in regard to tuberculosis, the instruction in general sanitation and the agitation of the subject must of necessity produce beneficial results and an improvement in the conditions under which the negro lives. Any improvement in the health conditions among the negroes will be beneficial to the country as a whole, and this work should, therefore, be fostered in every way possible, not only by the Federal Government, but by state and local officials and others interested in the cause of general sanitation.

HOOKWORM DISEASE.

The report on hookworm disease in its relation to child labor, which has been prepared at the request of the Secretary of the Department of Commerce and Labor, and to which reference was made in the annual report for 1908, page 52, has been completed. This report was prepared by Dr. Ch. Wardell Stiles, Chief of the Division of Zoology, who has had actual experience with the tenement white class both before and after they enter the mills. As shown in the last annual report, his conclusions on the subject of child labor in the South are not in harmony with those popularly entertained. He is of the opinion that this subject in the South involves questions which give to it an aspect quite different from

that of child labor in the North, and his conclusions can best be summarized by his statement that if he had to choose between placing his own 10-year-old daughter in the spinning room of a cotton mill and placing her on the average small tenant farm of the South he would be obliged, in the best interest of the child, to send her to the mill. In 1902, when he pointed out the widespread prevalence of hookworm disease in the South, Doctor Stiles's views were regarded by some as extreme, but to-day it is generally admitted that those views were correct, and there are gratifying indications of a popular awakening of public sentiment which will eventually lead to an improvement in the sanitary conditions.

During the present fiscal year he has inspected 26 factories in New England, including 16 cotton mills and 1 knitting mill, but in an examination of the 1,437 cotton-mill hands seen he has failed to find a single case of that severe type of anæmia (known as "cotton-mill anæmia") which he found in 12.6 per cent of the cotton-mill hands of the South. As the New England mills are using cotton from the southern cotton mills, and as the mill hands are therefore breathing in the same kind of lint as are the southern cotton-mill hands, these observations give an additional proof of the error of the popular idea that the condition of the latter mill hands is due to the breathing in of lint. Such an array of data are now on hand which are not in harmony with the lint theory that when all facts are published he believes public opinion on this theory will of necessity undergo a change.

ERADICATION.

The general subject of hookworm disease is deserving of earnest attention on the part of the Federal Government, and provision should be made whereby the Public Health and Marine-Hospital Service can cooperate with state and territorial health authorities in their efforts to eradicate the disease and eliminate the excessive morbidity caused by it.

Hookworm disease is due to soil pollution, and in order to awaken popular interest in the subject of soil pollution in relation to the disease Doctor Stiles, in connection with his other duties, has been given details where he could lecture on the subject at the following places: Winnipeg, Canada, Asheville, N. C., and Atlanta, Ga. In addition, he spent some time under orders in investigations of the disease in connection with the Country Life Commission appointed by the President. He has also given 25 popular and technical lectures on this subject in five States, without any expense to the Government, using part of his annual leave for the purpose.

While the eradication of hookworm disease within a State is primarily the duty of its sanitary authorities, nevertheless, on account of the widespread distribution of the disease and its baneful influence on the population of the country as a whole, the Federal Government should cooperate with state authorities, and this cooperation should include a widespread campaign of education regarding the measures necessary to prevent the transmission of hookworm disease and treatment of the large number of persons afflicted in different sections of the country.

It is gratifying to note here that since the close of the fiscal year a gift of \$1,000,000 by Mr. John D. Rockefeller for the purpose of eradicating hookworm disease has been announced, and a commission has been appointed by him for the management of this fund, Doctor Stiles, of this service, being named as one of the members of this commission.

HEALTH PROBLEMS ON AMERICAN FARMS.

The commission that was appointed by the President to investigate the conditions of life on American farms requested that some assistance be rendered by the service regarding the insanitary conditions in certain areas and the means necessary for their improvement. Dr. C. W. Stiles, Chief of the Division of Zoology, of the Hygienic Laboratory, was accordingly instructed to render such assistance, and in a report prepared by him there is given a brief statement of certain health problems on American farms. In this report, which will be published, it is stated that health conditions in the open country are in need of betterment, and these health problems are classified as of national and sectional importance. Among the national problems affecting farm life are mentioned the lack of popular education as to what good sanitary conditions are; soil and water pollution, resulting particularly in typhoid fever; promiscuous expectoration, resulting in tuberculosis; promiscuous indulgence in patent medicines and alcoholic drinks; unwholesome, poorly prepared, and monotonous diet; lack of proper ventilation and cleanliness; the long hours at work and lack of recreation; and lack of care with respect to milk and water supplies. Among the questions of sectional importance are included the extensive spread of diseases, such as hookworm disease, malaria, and typhoid fever; insanitary conditions of life among the negroes and certain of the white population in the Appalachian region; and the danger of the introduction and spread of rural exotic diseases on account of the arrival of large numbers of foreigners from abroad.

Life on the farm should be more healthful than in the city, and this is true in large sections of the country. On the other hand, there are certain areas in which sanitary arrangements are deficient, where typhoid fever, hookworm disease, and tuberculosis are especially prevalent and where the morbidity and mortality rates are excessive. There is necessity for the improvement of sanitary conditions in such localities, and it is necessary to take into account the conditions under which life is led and the association of the races which go to make up the general population.

RACIAL CONDITIONS.

One of the natural results of bringing into close contact two different races is to complicate the sanitary conditions under which they live. This may result from the different habits found in the two races or from the fact that either race may possess a relative immunity to one or more diseases to which the other race (representing more or less virgin soil for that disease) may be particularly susceptible. In some of the Southern States circumstances of this kind exist. From present data it appears that the negro is less susceptible

to the effects of malaria, hookworm disease, and Cochin China diarrhea than is the white, but that he is apparently more susceptible to tuberculosis. In each race the diseases, becoming established, have been attended with serious results according to the respective susceptibilities. For instance, the insanitary conditions under which the negroes live and their great susceptibility to tuberculosis make them more or less a menace to the white race living in the same community. This may be illustrated by the statistics on typhoid fever.

TYPHOID DEATH RATE IN THE NEGRO POPULATION.

The Twelfth Census gives the average negro population for the entire country as 11.6 per cent, and the average typhoid-fever death rate is 45.5 deaths per 100,000 inhabitants. In his studies Doctor Stiles has divided the 50 States and Territories of the United States, tabulated in the Twelfth Census (1900), into three groups, as follows:

(a) Fifteen States which stand above the average (11.6 per cent) in negro population, average 34.34 per cent in negro population and 72.70 per 100,000 in their typhoid death rate;

(b) Seventeen States, which have at least 1 per cent but not over 10 per cent negro population, average 2.48 per cent in negro population and 39.25 per 100,000 in their typhoid death rate.

(c) Eighteen States, which have less than 1 per cent negro population, average 0.42 per cent in negro population, and 25.51 per 100,000 in their typhoid death rate.

This comparison strongly indicates that in our country the typhoid fever rate is increased, and in those sections having a large negro population. Doctor Stiles has compared the statistics of the white and negro with respect to the typhoid fever death rate with the following results:

The typhoid death rate of white males when compared with that of negro males is as 37.4 to 75.3.

The typhoid death rate of white females when compared with that of negro females is as 27.4 to 56.3.

NEED OF EDUCATION IN SANITATION.

Fortunately sanitary science has already reached the point that it will be possible to reduce to a minimum the hygienic handicap which existing conditions have brought about. With the excellent natural conditions in the Southern States, for instance, a radical improvement in the sanitary conditions can be depended upon greatly to reduce the death rate. In order to bring about a reduction of the death rate, there is demand for education regarding the necessities of sanitation. As most of the negroes and many whites are tenants, it is the duty of landowners to provide better sanitary accommodations for them. Until there is an awakening to the necessity of such provision, the people as a whole can not complain if the negro forms a reservoir for typhoid fever, hookworm disease, and other infections.

What is needed in the country is proper sanitation, better educational facilities, and more recreation. It would appear to be a duty of the Federal Government to disseminate information as to the necessity of these improvements and the means necessary to bring them about.

NATIONAL LEPROSY INVESTIGATION STATION.

BUILDINGS COMPLETED.

In previous annual reports reference has been made to the measures adopted for the establishment of an investigation station for the study of leprosy on the island of Molokai. It was shown that although the establishment of the station was authorized by Congress March 3, 1905, the difficulties in erecting the buildings were so great as to be almost insurmountable. This was due to the isolated location and the dread of leprosy itself. Finally Mr. F. W. Pease, inspector of repairs, was sent to the islands with instructions to take all steps necessary looking to the erection of the buildings and completion of the station. Soon after arrival in Honolulu, October 30, 1907, he inspected the site that had been reserved by the Government, and selected the exact places for the location of the buildings to be erected within the reservation, which is situated on the east side of the tongue of land or peninsula, midway between the north coast of the island of Molokai, and distant about 55 miles north of east from Honolulu. Thirty houses occupied by lepers were on the site. The leper occupants had to be moved to the territorial leper settlement, after which the buildings were demolished and the débris burned. Immediately after inspection of the reservation schedules and specifications for necessary materials were prepared. Competitive proposals for supplying these and other necessary materials were invited by advertisement. The proposals were opened December 18, 1907, and the lowest accepted. Soon thereafter shipment of the materials from Honolulu to Molokai was begun.

In the employment of labor it was necessary to consider the applications of only such laborers as would be easily controlled and submit to isolation on the reservation. Furthermore, the laborers were required to provide their own subsistence; current rates were paid for labor and eight hours constituted a day's work. Upon the arrival of the materials at Kalaupapa they were landed and their transportation by wagon to the reservation at Kalawao, 3 miles distant from the landing, was begun.

On January 2, 1908, work was commenced on temporary quarters for the employees.

Crushed rock for concrete piers, foundations, and floors was provided under accepted proposal from parties having a rock crusher at Kalaupapa. Sand was obtained from the beach near Kalaupapa.

The first permanent building to be erected was the storage building, followed by the power house and cold-storage building, the director's quarters, the pharmacist's quarters, the administration and laboratory buildings, the attendants' quarters, the morgue, the lavatory, the laundry, the hospital, the surgery, and the stable.

As required by the progress of building operations, competitive proposals were invited for furnishing additional material. On account of the large quantity of lumber required, proposals were invited from local firms engaged in the lumber business for supplying lumber by vessel from the Pacific coast, with the result that much lower prices were obtained.

As a result of this arrangement a vessel arrived at Kalaupapa in May, 1908, and discharged 420,000 feet of lumber and shingles, all of which were hauled by team to the reservation.

The inspector of repairs, who had charge of the building operations, increased and diminished the force of workmen as required. He states that an ample sewer system has been provided, one line from the residence compound and the other from the hospital compound, both discharging into the sea at low-water line.

A complete system of plumbing has been installed in all the buildings, with laundry trays, sinks, water-closets, lavatories, bath tubs, shower baths, slop sinks, garden hose outlets, and fire hose stand-pipes in the grounds adjacent to the buildings.

There has been installed an electric lighting system with 30-horsepower gasoline engine and direct-current dynamo, supplying 290 sixteen candlepower lamps.

A combined ice-making and refrigerating plant has been installed, having a capacity of 1 ton of refrigeration, and is capable of producing about 1,000 pounds of ice per day. The refrigerating plant is operated by a 12-inch diameter water wheel.

In order to supply the necessary gas for use in the laboratory, surgery, and elsewhere, a 50-light gas machine was also provided.

The inspector reports that the exterior of all the buildings has been painted and that necessary fences with gates have been built. On July 1, 1909, therefore, the station was practically ready for occupancy, all the construction work having been completed except proper screening of the buildings.

The hospital will accommodate 15 patients and has ample space for necessary nurses. It is also provided with kitchen, dining room, bath-rooms, and toilet room. In the attendants' quarters there are 12 rooms—a dining room, kitchen, laundry, and toilet rooms. The stable contains 6 stalls, a feed room, harness room, and wagon space. This will accommodate the animals necessary in the transportation of materials, which must all be brought from the landing, some distance away.

The buildings are of wood on concrete foundations and of the bungalow type, the floor and porch space of all the buildings equaling 48,000 square feet. The large porch space permits of practically an outdoor life and is intended to overcome the inconveniences of prolonged high temperatures and life in the Tropics.

PROVISION FOR WATER SUPPLY.

The pipe line of the water supply for the territorial leper settlement crosses a corner of the reservation of the leprosy investigation station. It was expected that arrangements could be made to obtain a sufficient amount of water from this source, and proposals were requested from the territorial authorities to furnish the necessary water. In returning the proposals, the president of the territorial board of health stated that the amount of water available was hardly sufficient for the uses of the territorial leper settlement itself, and that it would be impracticable to furnish an adequate supply also to the leprosy investigation station. It was explained by the president

of the board, however, that the legislature had made partial provision for enlarging the water supply, having appropriated funds which had been sufficient to purchase additional water pipe necessary. The appropriation was not sufficient to lay the pipe, and the additional money necessary could not be secured until the territorial legislature should meet in 1909.

While arrangements were subsequently made with the territorial authorities to secure a very small amount of water daily for building purposes, it was recognized that it would be impossible to operate the leprosy investigation station until an adequate supply of water could be secured. In anticipation of this need, the inspector of repairs was directed on March 7, 1908, to report upon the feasibility of establishing an independent water supply, and also the cost of extending the waterworks of the territorial leper settlement. A report from this officer, dated June 9, 1908, showed that the cost of materials and labor for providing an independent water supply would be \$24,792.60, and would require six months to complete the work. He also forwarded estimates prepared by the superintendent of public works of Hawaii, showing that the extension of the water supply of the territorial leper settlement could be completed for a sum not to exceed \$4,050, the estimated time in which to complete the work being sixty days. This latter plan appeared altogether the more advantageous, and the only one by which an adequate water supply could be secured without delaying for one year the opening of the hospital. Mr. Pease, the inspector of repairs, accordingly submitted a letter from the president of the territorial board of health, together with correspondence, constituting a proposal to furnish the leprosy investigation station with water for all purposes, in perpetuity, in consideration of the expenditure of \$4,050 on the part of the United States Public Health and Marine-Hospital Service for laying the cast-iron pipe, which was already on the ground, from the national leprosy investigation station to the intake, and also the construction of intake screens and house.

The correspondence was accordingly referred to the Comptroller of the Treasury for a decision as to whether the sum of \$4,050 could be paid from the appropriation of \$100,000 provided for by the act of Congress approved March 3, 1905, for the building and equipment of the leprosy investigation station. In a decision rendered July 9, 1908, the Comptroller stated that it was not the intention of Congress to have this appropriation expended in the erection of a system of waterworks, and especially to expend it in a system belonging to and owned by the Hawaiian government. For these reasons he held that the department was not authorized to expend the above-mentioned appropriation to lay the pipes in question belonging to the Hawaiian authorities. The only alternative, therefore, was to submit estimates to Congress with the view to securing an appropriation for the purpose. As a result, an item was included in the act making appropriations for the sundry civil expenses of the Government for the fiscal year ending June 30, 1910, in order to enable the Secretary of the Treasury to accept the proposal of the proper authorities of the Territory of Hawaii, in amount not to exceed \$4,500, to make sufficient extension of the water-supply system of the leper settlement on Molokai to provide an adequate water supply also to the leprosy investigation station of the United States, provided that the right to said adequate water supply would be granted in perpetuity.

Upon the passage of the act the appropriation of \$4,500 became immediately available. The proposal of the territorial authorities was therefore accepted, and Mr. Pease, the inspector of repairs, was directed on May 17, 1909, to certify when the work was satisfactorily completed under the direction of the superintendent of public works of Hawaii.

On July 2, 1909, Mr. Pease reported that the necessary extension of the water-supply system of the leper settlement had been satisfactorily completed at a total expense of \$1,390.97. In addition, he reported that by extending the line of 8-inch pipe up Waikolu Valley to the new and additional source of supply, a continuous and bountiful supply of water to the leper settlement as well as to the leprosy investigation station had been secured. The pressure of water in the 8-inch pipe line opposite the director's quarters when tested was 97½ pounds. A main supply pipe 4 inches in diameter was installed to supply the buildings of the leprosy investigation station, and with the pressure stated was sufficient to discharge 480,000 gallons for twenty-four hours through a length of 2,000 linear feet of said pipe. An adequate supply of water therefore is now available for all purposes for the use of the station, and it was secured at a very much less cost than was anticipated.

PROVISION FOR BOAT LANDING.

When the site, 1 mile square, was set aside by the territorial authorities on the island of Molokai to be used in the establishment of a leprosy investigation station, it was recognized that provision should be made for a landing place. A part of the land set aside therefore included the boat landing at Makaluahau and all the land on the western exposure of the adjacent hill, as well as the right of way over the path leading from the reservation proper around the foot of the cliff, and thence along the beach to the boat landing mentioned. It was recognized that such provision should be made, because the landing place mentioned was very much nearer than the landing place at Kalaupapa, and on account of exposure landing at Kalaupapa was sometimes impossible during rough weather.

After the construction of the buildings was in progress, it became apparent that the landing at Makaluahau should be so improved as to admit of landing passengers and supplies there. Until such improvement was made the only means of access to the leprosy investigation station was through the territorial leper settlement from the landing at Kalaupapa. Such landing and communication with the leper settlement was objectionable, as both persons and food supplies would be brought in contact with lepers, thus causing needless exposure to the disease.

An item was therefore included in the estimates to Congress, and in the act making appropriations for the sundry civil expenses of the Government for the year ended June 30, 1909, an appropriation of \$1,000 was made for constructing a boat landing for the use of the leprosy investigation station. Mr. Pease was thereupon instructed to take the necessary steps looking to the completion of this work, and in a report of June 28, 1909, he stated that the landing had been built at an expenditure of \$933.31, including construction

of the necessary footbridge over Waikolu stream to afford access to the landing. This boat landing is 112 feet long, and has an average width of 12 feet. On account of its more protected location landing here will be attended with much less difficulty than the Kalaupapa landing of the leper settlement.

In the Annual Report for 1905, pages 197-207, will be found a full description of the site of the leprosy investigation station, together with copy of the law authorizing its establishment and correspondence showing its necessity.

OPERATIONS OF THE LEPROSY INVESTIGATION STATION.

On account of the delay in completing the station it was necessary to continue the investigations at the temporary laboratory in Honolulu. In the meantime administrative details were carried on with the view to securing the necessary equipment and getting it ready for use as soon as the station was ready for occupancy. As above stated, the buildings were completed July 1, 1909, but on account of the possible danger of transmission of the infection of leprosy by means of flies, mosquitoes, and other insects, it was necessary that the station be thoroughly screened before leper patients were admitted. Bids for necessary screening were taken, but the prices asked were deemed excessive, and it was decided to secure new bids from manufacturers of wire cloth in the Eastern States. As a result, the screening was purchased at a cost of over \$800 less than the original bids.

On July 1, 1909, a part of the personnel of the station took up their permanent residence there to get the station in final shape for the admittance of patients. This force has installed the necessary furniture and apparatus, and engaged in clearing the grounds of debris, brush, and boulders.

While these preparatory steps for the opening of the station have been under way the time has been utilized also in carrying on the scientific investigations. In the annual reports for 1907 and 1908 reference was made to provisions for the study of incipient cases as a part of the general investigation. This work has been actively carried on during the past year, and the results obtained are represented in the scientific publications which have been prepared and issued and to which reference has previously been made. These reports are a forecast of the larger problems which will be investigated when the station is in complete operation.

The advantages of the investigations of incipient cases will continue to exist even after the main station is opened, as such cases present the best opportunity for the study of early methods of diagnosis and means of relief. Such cases are utilized in studies on complement fixation tests in leprosy; studies of the pathological anatomy of the nasal cavity in leprosy; in treatment of incipient cases of leprosy with tuberculin, atoxyol, strychnine, chaulmoogra oil, and cinna-mate of soda; in examination of the urine of lepers for acid-fast bacilli; and attempts are being made to grow the *lepra bacillus* on several media.

On the other hand, experiments on animals and such other work as requires large amounts of leprous material can best be carried on at the station on Molokai where the service has full control of the

patients under its care. Both lines of investigation are of importance, each assists the other, and together they form a comprehensive plan that should bring about results for which the investigation was begun.

The many problems that leprosy presents have for convenience been grouped into two classes:

The first group includes four important problems, namely: The growth of the lepra bacillus on artificial media; the successful inoculation of the lower animals; the discovery of a substance analogous to tuberculin, of use as a remedial or diagnostic agent; the discovery of the usual mechanism whereby the infection spreads from one person to another.

In the second group are included lesser problems that step by step add to our knowledge of the disease, and while not apparently of so great immediate importance, yet may indicate the path that leads to the solution of the greater problems mentioned.

The investigations inaugurated have for their primary object the solution of the greater problems mentioned, but it is realized that scientists in many lands have sought in vain for their solution, and years may elapse before success is attained.

If, however, efforts were thus confined, the station might continue its work for years without obtaining results worthy of publication, and the greatest utility to the sanitary and scientific world would not be subserved. Every effort will therefore be made to throw all possible light on different phases of the leprosy problem, and it is expected that results will be obtained from time to time that permit of positive opinions and announcements.

With a well-equipped station and laboratory, an abundance of clinical material, and a well-trained corps of scientific workers, it is reasonable to expect that interesting and useful knowledge bearing on leprosy will be obtained.

Leprosy bulletins.—Two brochures, each entitled "Studies upon Leprosy," have been issued from the station during the past fiscal year. In the first bulletin the author deals with: First, "The present status of the leprosy problem in Hawaii;" second, "The reaction of lepers to Moro's 'percutaneous' test;" third, "A note upon the possibility of the mosquito acting in the transmission of leprosy." From these studies it is concluded that the leprosy problem in Hawaii calls for more thorough enforcement of the laws of segregation, and that the field for the study of leprosy furnished by the Territory of Hawaii is unsurpassed, and merits the most painstaking efforts to utilize it to the utmost. The percutaneous tuberculin test of Moro is shown to be of no value in the differential diagnosis of leprosy and tuberculosis. The studies of the mosquito do not permit of a positive statement that this insect functions in the transmission of leprosy, and the probabilities are against such mode of transmission.

The second brochure containing "Studies upon Leprosy" contains the results of investigations to determine the utility of the examination of the nose and the nasal secretions for the detection of incipient cases of leprosy.

The theory has been advanced that the nasal septum is the site of the initial lesion in leprosy, and with the view to determine its correctness these investigations were made. They included the examination of 407 Hawaiians, and have resulted in tentative conclusions to

the effect that the examination of the nasal septum and the nasal secretions is not of dominant value in confirming the diagnosis of leprosy in the early stages of the disease. At the same time, it is recognized that when it is not practicable to make a complete examination of all individuals of a class suspected of leprosy, the examination of the nasal septum and the bacteriologic examination of the nasal secretions will prove of value by permitting the recognition of a most dangerous type of the disease, and is therefore worth while even if it does not reveal all cases of the disease in those who come under observation.

CARE OF LEPERS IN THE UNITED STATES.

The great majority of the States and Territories in the continental part of the United States require the reporting and segregation of cases of leprosy, and classes the disease as dangerous and communicable. In some communities, however, the policy of reporting and segregation does not prevail. While there are relatively few cases of leprosy in the continental United States, these are located in 13 States, and there is evidence that they are not all segregated, nor is the country afforded the protection which it should have. In some States segregation is practiced, but in others there is no isolation or segregation, and in New York City, the largest city in the United States, with a congestion of population which would furnish good opportunities for transmission, segregation is not practiced. Cases of leprosy are reported from time to time by state and territorial health authorities, with requests for advice as to their disposition. In the absence of national law providing for their care, the state authorities can only be advised that the care and segregation of such cases must devolve upon the State itself. Many of the States, on the other hand, have made no provision for such an exigency, consequently proper precautions can not be taken to protect the public health, and the victim of the disease is also made to suffer through lack of such provision. A bill was introduced in the Fifty-eighth Congress which contemplated the establishment by the National Government of a leprosarium for the segregation of lepers and to prevent the spread of leprosy in the United States.

It is not necessary to review the arguments in favor of that measure, but there is still a demand for the authority which the bill provided.

SECOND INTERNATIONAL CONFERENCE ON LEPROSY.

The Second International Conference on Leprosy was held in Bergen, Norway, August 16-19, 1909, and Passed Asst. Surg. Donald H. Currie, director of the leprosy investigation station on Molokai, was designated as a delegate on behalf of the United States to the conference.

With the view to presenting to the conference the status of leprosy in the United States and its possessions at the present time, the bureau called for reports from the state and territorial health authorities as to the number of cases of leprosy in their jurisdictions and the methods of handling them. The data secured was compiled and incorporated in a report which was prepared by Dr. W. R. Brinckerhoff, assistant director of the leprosy investigation station, for presentation

before the above-mentioned conference. In this report it is shown that there are at present 139 cases of leprosy scattered over 13 States and the District of Columbia. It was also shown that there are at present 764 cases of leprosy in Hawaii, 17 in Porto Rico, 2,330 in the Philippine Islands, and 7 in the Canal Zone. The conference was also informed of the steps taken in the United States looking to the control of leprosy since the first leper conference, in 1897.^a Reference was made to the exhaustive report on the origin and prevalence of leprosy in the United States made by the commission of medical officers of the Public Health and Marine-Hospital Service, on November 30, 1901, in accordance with the act of Congress approved March 2, 1899. The attention of the conference was invited to the establishment of the leprosy investigation station on the island of Molokai for the investigation of leprosy, with special reference to the care and treatment of lepers in Hawaii. This report also referred to the establishment of a leper hospital and enforcement of segregation by the State of Massachusetts and the enactment of an adequate leper law in Hawaii and the Philippine Islands.

In addition to matters of an administrative character in respect to leprosy, the conference also considered the disease from a scientific standpoint, and the following resolutions were adopted:

RESOLUTIONS ADOPTED BY THE SECOND LEPROSY CONFERENCE.

A.

I. The Second International Scientific Conference on Leprosy confirms in every respect the resolutions adopted by the First International Conference of Berlin, 1897.

Leprosy is a disease which is contagious from person to person, whatever may be the method by which this contagion is effected. Every country, in whatever latitude it is situated, is within the range of possible infection by leprosy, and may, therefore, usefully undertake measures to protect itself.

II. In view of the success obtained in Germany, Iceland, Norway, and Sweden, it is desirable that other countries should isolate lepers.

III. It is desirable that the children of lepers should be separated from their parents as soon as possible, and that they should remain under observation.

IV. An examination should be made from time to time of those having lived with lepers by a doctor having special knowledge.

It is desirable that lepers should not engage in certain trades or occupations. All leper vagabonds and beggars should be strictly isolated.

B.

V. All theories on etiology and the mode of propagation of leprosy should be carefully examined to ascertain if they accord with our knowledge of the nature and biology of the bacillus of leprosy.

The above resolutions are in harmony with the resolutions adopted by the First International Leprosy Conference held in Berlin in 1897, which are as follows:

1. In countries in which leprosy forms foci or has a great extension, isolation is the best means of preventing the spread of the disease.

2. The system of obligatory notification and of observation and isolation, as carried out in Norway, is recommended to all nations with local self-government and a sufficient number of physicians.

3. It should be left to the legal authorities, after consultation with the medical authorities, to take such measures as are applicable to the special social conditions of the districts.

^a For full report of the First Leper Conference, see Annual Report Marine-Hospital Service, 1897.

PREVALENCE OF LEPROSY IN VARIOUS COUNTRIES.

Following the opening of the leprosy conference at Bergen, Norway, in August, 1909, certain official delegates presented their reports on the status of leprosy and the measures adopted against it in the countries they represented. Such reports were made from the following countries: Germany, France, Russia, Austria-Hungary, Italy, Japan, Belgium, United States of America, and Argentine Republic.

From the reports, and from other data furnished the delegates by the Norwegian Government, it appears that the following enumeration may be considered as a fairly accurate estimate of the number of cases of leprosy in the several countries mentioned. In studying such data, however, the fact must be kept in mind that a comparatively large percentage of lepers are not recognized in the early stages of the disease, and further that concealment of cases probably exists to a greater or less extent in every country on the globe which adopts any measures looking to the isolation of such cases.

	Cases.
France -----	246
Iceland -----	200
Germany -----	28
Roumania -----	208
Servia -----	3
Bulgaria -----	9
European Turkey -----	550
Greece -----	9
Crete -----	600
Russia -----	1, 372
Italy -----	123
Spain -----	240
Palestine -----	800
India -----	97, 340
Ceylon -----	589
Indo-China -----	10, 500
Java -----	15, 000
Borneo -----	68
Sumatra -----	896
Japan -----	40, 000
Canada -----	20
Cuba -----	1, 297
Jamaica -----	115
United States of Colombia -----	4, 152
Argentine Republic -----	12, 000
Algeria (in twenty-six years) -----	109
United States of America :	
Mainland of America -----	146
Hawaiian Islands -----	764
Porto Rico -----	17
Guam -----	19
Philippine Islands -----	2, 330
Canal Zone -----	7

A full report of the Second International Conference on Leprosy was published in Public Health Reports September 17, 1909.

RELATIONS TO THE PHARMACOPŒIA.

DIGEST OF COMMENTS.

In the annual report for 1908, page 64, reference is made to resolutions adopted by the board of trustees of the United States Pharmacopœial Convention calling on the bureau to undertake the publication

of a series of bulletins embodying digests of comments on the pharmacopœia. This work was begun in the Division of Pharmacology of the Hygienic Laboratory, and the first digest of comments was compiled and published during the fiscal year as Bulletin 49. In beginning the work it was decided to compile the material chronologically, so as to present the available comments in proper sequence. The above-mentioned bulletin, therefore, deals with literature of the latter half of 1905, representing the period from the publication of the Eighth Decennial Revision of the Pharmacopœia to December 31, 1905.

The comments on Bulletin 49 are interesting and suggestive as indicative of current opinions regarding the future of this work and the development of the Division of Pharmacology. In most foreign countries the pharmacopœia is a government publication, and its preparation is purely a governmental function. For eighty-five years the Pharmacopœia of the United States of America has been by contrast a wholly private enterprise, compiled, developed, and published by members of a voluntary organization and attaining a legal status only gradually through the enactment of statutes by the several States which recognized its standards. Through recent national legislation this publication has become the federal standard, and the significance and far-reaching effects of this change of status are shown by the fact that within a year some revision of the pharmacopœia was made necessary. The problem now to be faced by the Government on the one hand and by the makers of the pharmacopœia on the other is as to what shall be the attitude of each to the other with reference to what has been denominated "a sanitary institution of the first rank."

It is altogether consonant with our ideals of a democratic form of government that the work already done has been welcomed as evidence that the relation of the Federal Government to the pharmacopœial convention is to be that of cooperation without domination.

The first volume of digests already published has been accepted by those interested as an expression of governmental interest in a volume of national consequence, and that such interest is second only to the legislative action making it the official standard in this country.

A second digest of comments on the pharmacopœia has also been prepared and submitted for publication as Bulletin 58 of the Hygienic Laboratory. This second bulletin covers the literature for the calendar year ended December 31, 1906. This period was one of unusual interest and activity in matters relating to the Pharmacopœia of the United States. The enactment of the Food and Drugs Act, June 30, 1906, followed by the signing on November 29, 1906, of an agreement by the United States and other powers regarding the unification of the pharmacopœial formulas for potent drugs by a diplomatic representative of the Federal Government involves the evolution of an independent, more or less local, and purely academic book into a recognized legal standard for the development of which the Government has incurred treaty obligations of an international character.

Since the Pharmacopœia of the United States and the National Formulary have become legal standards the medicaments to be incorporated must receive careful study and the collection of disinterested information. This is necessary, inasmuch as not only powerful financial interests but the maintenance of the public health are in-

volved. In accordance with the resolution adopted by the American Pharmaceutical Association, to which reference was made in the annual report for 1908, page 65, the second digest of comments that has been prepared related also to the National Formulary. In the work of compilation it was necessary to have access to as many representative pharmaceutical and chemical periodicals as possible. This has been difficult to arrange, but through the action of the trustees of the pharmaceutical convention and the courtesy of librarians of certain colleges access has been had to the more important publications. Access has also been had to the reports of state boards of health and laboratory reports of some manufacturing establishments. These reports, in addition to calling attention to the kind of adulteration and substitution in vogue, also demonstrate the need for constant watchfulness to insure the purity of therapeutic remedies.

It becomes more and more evident that the material compiled and placed at the disposal of the pharmaceutical convention and others interested will be of great value as a source of information for use in the correction of standards and the right of the various remedies to official recognition.

INVESTIGATION OF REMEDIES.

Besides the compiling and publication of a series of comments, there is also a great deal of important work to be done in relation to the remedies to be incorporated in the pharmacopœia, and the chairman of the revision committee has advocated the carrying on of such work in a government proving laboratory. The necessary test for the identity and purity of official remedies should be elaborated by workers who are free from the stress of commercial self-interest and competition, and such work can be carried on in the Hygienic Laboratory, where the methods of making official preparations of official drugs and the standardizing of such preparations when so made should also be done.

Much work has been carried on in the Division of Pharmacology (Hygienic Laboratory) in relation to therapeutic remedies that has thrown additional light on the strength and value of the preparations studied. As a result of this work and in view of the coming pharmaceutical convention, the chairman of the committee of revision, in a letter of March 27, 1909, requested that some additional work be undertaken bearing on the determination of melting points and boiling points in the pharmacopœia. He pointed out that the melting point and boiling point of the various substances contained in the present pharmacopœia had not all been determined by the same method, and that chemists and physicists were not united on the best and simplest means of determining these factors. He stated that there was necessity for a uniform method for taking the melting point and boiling point, and requested that tests be made, and that comparative tables be prepared for use in the next revision of the pharmacopœia. It was decided, with the approval of the Secretary, to undertake this work, and investigations are now in progress with the view to the determination of the physical constants of pharmacopœial substances, which include boiling points, melting points, and solubilities.

The results of investigations into the relation of the iodine content to the physiologic activity of thyroid preparations, the physiological standardization of suprarenal preparations, and such drugs as digitalis, the toxicity of acetanilid mixtures, and the standardization of antitetanic serum, which have been published, should be of value to members of the pharmacopeial convention.

Through scientific research, an extensive series of new compounds of the choline type have been made in the Hygienic Laboratory and studied from a toxicologic standpoint. Some of these are physiologically very active, and give promise of being of use therapeutically, while others are closely related to substances occurring normally or abnormally in the body, and may prove of interest in relation to health and disease.

COUNCIL ON PHARMACY AND CHEMISTRY.

Closely related with the work of the service in connection with the United States Pharmacopœia is its cooperation with the American Medical Association of the work of the Council on Pharmacy and Chemistry, four of whose members are government officials, two of them in the Division of Pharmacology. In addition to the routine work carried on in connection with the council with reference to the general question of new remedies, it has been shown in the Division of Pharmacology that digalen, a preparation of world-wide use, under certain conditions, becomes inert. There has also been demonstrated the variability of the extremely potent suprarenal preparations. It has also been shown that some of the preparations used to increase the utilization of food actually contained thyroid having opposite actions to those claimed. Many unofficial drugs which have been used to a greater or lesser extent, some of them official at one time or another, are being studied with a view to determining whether they are of sufficient merit to justify therapeutic use.

MILK AND ITS RELATION TO THE PUBLIC HEALTH.

In the last annual report reference was made to investigations of milk and the incorporation of the results in Hygienic Laboratory Bulletin No. 41. The first edition of this bulletin, which was issued January, 1908, has proven of great value to health officers and others interested in improving milk supplies, as was shown by the enormous demand throughout the world for copies. The first edition was long since exhausted, and it therefore became necessary to publish a second edition. On account of the short time since the first edition appeared and the character of some of the data relating to the investigations, especially that contained in the statistical table, it was impracticable to include corresponding statistics for the year 1908. The limitations of the volume have also prevented the inclusion of chapters relating to certain milk products, but it is expected that these subjects will be given consideration in later publications. Important chapters, however, were added in the new edition bearing on the relationship of the tuberculous cow to public health; the thermal death point of micro-organisms in milk; the relative proportion of bacteria in top milk and bottom milk, its bearing on infant feeding; and the national inspection of milk. This bulletin illustrates several points

worthy of mention. It demonstrates the possibility of the various departments of the Government cooperating in public-health matters, and sets a precedent for similar work in the future.

There are many other subjects relating to the public health, such as air, water, sewage, disposal of wastes, soil pollution, industrial hygiene, disinfectants, the hygiene of habitations, and personal hygiene, which could be treated in a similar way and which would be of distinct value.

THE RAT AND ITS RELATION TO THE PUBLIC HEALTH.

On account of the influence of the rat in the transmission of plague, this animal must be taken into account more and more in the prevention of the introduction of the disease from one country to another, and its suppression in endemic areas.

Rats, like man, are great travelers, and by reason of this fact also they give rise to economic as well as public-health problems of great moment. Some idea of their danger in transmitting plague may be had when it is remembered that 51 countries have been infected with the disease since the present pandemic began in Canton, China, in 1894, and when it is known that at least 146 ships have had plague infection aboard during that time.

Recent outbreaks of plague and investigations made in relation thereto have brought out many valuable facts regarding the habits of the rat, the parasites that infest him, the diseases from which he suffers, and the measures necessary to his control. The appearance of plague in hitherto uninfected centers has also emphasized the lack of definite knowledge of this animal on the part of public-health officials. It has been shown by the British Plague Commission that plague among rats can be readily diagnosed from the gross pathological appearances by persons having experience, and that this is even more reliable than the bacteriologic findings. These facts have been confirmed by officers of the Public Health and Marine-Hospital Service engaged in antiplague measures, and, in addition, rats have been observed to suffer with other diseases, and with the view to aiding in the differential diagnoses of the various pathological conditions studies of the subject have been made.

On account of these facts the bureau has taken steps to have issued a bulletin entitled "The Rat and Its Relation to the Public Health." The bulletin will include chapters on "The natural history and habits of the rat," "The relation of rats to bubonic plague," "The ecto parasites of the rat," "The ento parasites of the rat," "The rat and its relation to trichinosis," "The bacterial diseases of the rat," "Plague among rats," "Organic diseases of the rat," "Leprosy-like disease of the rat," "Rat fleas in relation to the transmission of plague," "Rat extermination," "Practical rat proofing," "The rat as an economic factor," "The natural enemies of the rat," "Bacterial viruses and their use in rat extermination," "Rats in relation to ships and shipping," and "The rat in relation to international sanitation."

It is expected that the bulletin will be of value to public health officials and others engaged in the prevention of disease, and contain data upon which may be based future regulations and measures for the prevention of the transmission of diseases through this agency.

ALASKA-YUKON-PACIFIC EXPOSITION.

In a letter of September 22, 1908, the representative of the Treasury Department on the United States Government board of managers of the Alaska-Yukon-Pacific Exposition requested that an officer be designated to cooperate with that office in the preparation and assembling of a suitable exhibit of the service as a part of the exhibit of the Treasury Department. In accordance with this request, Asst. Surg. Gen. J. W. Kerr was designated to assemble an exhibit with the aid of other officers of the service.

The floor space set aside for the service exhibit was approximately 1,500 square feet, and \$1,000 was made available for the use of the bureau in preparing the exhibit in question. On account of the small amount of money available it was necessary to use practically the same exhibit as was shown at the Jamestown Exposition, and this could be done with advantage, as the materials had never been shown in the northwestern States. The part of the original exhibit used included the following:

An operating room with lay figures.

An operating room and furniture.

A hospital ward with furniture.

Clinical records and hospital appliances.

Laboratory apparatus and an X-ray outfit.

Models of quarantine stations.

Models and photographs of the Marine-Hospital Sanatorium at Fort Stanton, N. Mex., and

An exhibit of viruses, serums, and toxins prepared in establishments licensed under the law of July 1, 1902.

The additions made to the exhibit included also models and charts relating to tuberculosis. Through Passed Asst. Surg. G. W. McCoy and Passed Asst. Surg. W. C. Rucker were added educational models illustrative of the work done by the Public Health and Marine-Hospital Service in suppressing epidemic diseases. These included a model of a house screened against the mosquitoes that carry yellow fever and malaria; the model of a section of an insanitary house showing drainpipes and rat-harboring places, and the influence of an unhygienic garbage barrel in attracting rats; taxidermal groups of the California ground squirrel, which is also a carrier of plague infection, and its natural enemies, and pathological specimens showing changes in the organs and tissues of rodents due to bubonic plague. The exhibit was completed and ready for shipment to Seattle March 15, 1909. On April 30, 1909, Passed Asst. Surg. M. W. Glover was placed in charge of the exhibit.

It was arranged to have stereopticon lectures given on tuberculosis, typhoid fever, hookworm disease, yellow fever, and plague, and the necessary slides relating to each of these diseases were prepared and forwarded to Doctor Glover to enable him to prepare the lectures which he was to give. In order to provide for proper demonstration of the other parts of the exhibit, including the X-ray machine, Dr. J. C. McGuire was appointed by the representative of the Treasury Department to assist Doctor Glover in this work.

In making the appropriation for the government exhibit Congress specifically provided that the exhibit in question should include an exposition of the manifold activities in the preservation of the pub-

lic health. The service exhibit was planned with this end in view, and the comments made indicate that it has been of great educational value. The display illustrating the measures taken in times of epidemics for the suppression of yellow fever and plague was especially instructive. The taxidermal groups, pathological specimens, and models of insanitary dwellings were all interesting because of the fact that rats and ground squirrels are known to act as carriers of plague, and on the Pacific coast as well as elsewhere, great care is necessary on the part of the householder to render his dwelling rat-proof and otherwise sanitary.

Public health exhibits are becoming a popular means of disseminating sanitary information, but in order that they may fulfill the purpose for which they are designed, they should embody practical ideas, and there should in future be provided sufficient funds and time in which to construct them.

AID IN ENFORCING PROPER USE OF THE MAILS, ETC.

In accordance with a request received from the Postmaster-General, an opinion was given to the effect that the use of the mails should also be extended to private laboratories as was the case with national, state, and municipal institutions. To this end it was recommended that all pathological tissues, except cholera and plague, be admitted to the mails under regulations prescribed by the Post-Office Department. Subsequent opinion on this same subject was given April 5, 1909, which stated that modified rules governing this subject were necessary and reasonable, and stating that the maximum size of sputum jars should be 4 drams, and test tubes to be sent in the mails, to be of tough glass not over one-half inch in diameter, and not over $3\frac{1}{2}$ inches in length.

In addition, opinions have been rendered to the Post-Office Department regarding the therapeutic value of certain appliances advertised for the cure of diseased conditions.

Examinations have also been made of a number of preparations advertised as disinfectants, and reports made thereon to the Secretary of the Treasury regarding their germicidal properties and adaptability for use in public buildings.

SPECIAL STUDIES IN LABORATORY, BUREAU OF FISHERIES, WOODS HOLE, MASS.

In a communication of April 21, 1909, Passed Asst. Surg. Joseph Goldberger referred to the recent discovery of a case of fatal infection of a man in Florida with *Sparganum proliferum*, a parasite reported and described in Hygienic Laboratory Bulletin No. 40, and invited attention to the total lack of knowledge of the method of transmission of this fatal disease and a suggestion in said bulletin that the eating of fish may play a rôle in its spread.

The practical importance of the study of this new disease was apparent, and also that it should be carried on in a laboratory containing material and where studies of the cestodes of fish, which had been begun, could be continued. On account of the advantages offered for such studies in the Marine Biological Laboratory of the Bureau of Fisheries, at Woods Hole, Mass., the Commissioner of the

Bureau of Fisheries was requested to extend the facilities of this laboratory. This was granted, and Doctor Goldberger was detailed for a period of eight weeks, beginning June 25, 1909, at Woods Hole, to make investigations of the parasites of fish, to study living specimens, and in addition to fix and preserve for later study in the Hygienic Laboratory such specimens as he might be able to obtain. A considerable amount of material was prepared and forwarded to the Hygienic Laboratory for future studies.

THE HYGIENIC LABORATORY.

The operations of the Hygienic Laboratory have been continued as in previous years, and some new problems have been taken up for investigation. This institution, which has been in existence for twenty-two years, is established on a solid foundation and has shown rapid but substantial development. That there is necessity for the maintenance of this laboratory is shown by the demands made upon it by Congress and the administrative departments of the Government and state and local health agencies.

The view that the work of the Hygienic Laboratory should be extended is strengthened by the growing demands made upon it. Research work in the sanitary sciences is one of the foundations upon which all wise sanitary administration must stand, and through this means the Federal Government can concern itself with problems of interstate sanitation, and in addition cooperate with state and local health authorities and improve sanitary administration in different parts of the country.

It is neither necessary nor desirable that every community should have a complex and expensive laboratory capable of dealing with all public-health problems. This would mean much unnecessary duplication of work. Small communities can not be expected to carry on systematic and extensive work of a research nature, or even handle sanitary problems of an unusual or highly specialized nature. Through its Hygienic Laboratory, however, the Federal Government can cooperate in the solution of such problems, and the dissemination of information in relation thereto is thus made available to the country as a whole.

When the present site of the Hygienic Laboratory was selected doubts were expressed as to the wisdom of building an institution in such an out-of-the-way and unhealthy locality. The neighborhood in which the laboratory is situated had long been regarded as an unhealthy part of the city. Since that time, however, conditions have changed, the malarious flats have been transformed into a beautiful reservation known as Potomac Park, and the improvements in the neighborhood have made it a notable situation in many respects. When the contemplated improvements shall have been made it will be one of the most conspicuous and inviting reservations in the District.

Buildings and grounds.—The crowded condition of the first building, which was occupied in 1903, was greatly relieved by the completion of the addition to the Hygienic Laboratory in the fiscal year covered by this report. Steps were taken to occupy the new addition in January, 1909, the furniture having been installed in the new rooms as they were completed by the contractor.

The Hygienic Laboratory now occupies a building 230 feet long containing 41 rooms. It is two stories in height with a basement and attic.

In addition, an animal house of brick and cement for the investigation of special problems in relation to contagious and infectious diseases has been constructed on one corner of the reservation. This building is 52 feet long by 25 feet wide, and contains a keeper's room besides six rooms for experimental work. The construction and equipment of this building is specially designed to prevent the spread of infection. It is surrounded by a brick and cement wall which contains a crematory where all refuse may be burned.

There are three other buildings upon the reservation; one is a wooden structure used for the raising of guinea pigs; another a stable in which the horses, goats, rabbits, and other animals are kept; and finally, a shed for wagons and general storage, a room for conducting disinfecting experiments with gaseous substances, and a carpenter shop. These three structures were built some years ago of very cheap material and were intended for temporary use only. They are small wooden structures, and because of their close proximity to other buildings are a constant source of danger from fire. All three buildings are going to decay, and the roofs, which are of shingle, will soon be in need of extensive repair. Such repairs would involve an expenditure that would not be justified, and the interests of the Government in efficiency and economy will best be conserved by their demolition and the construction of a new brick building of adequate size.

Practically all of the animals used in the laboratory are raised there, many of them being required in the examinations of viruses, serums, and toxins, in conformity with the law of July 1, 1902. These animals are very susceptible to extremes of temperature, and will not breed rapidly unless properly protected from cold. On account of the dilapidated condition of the wooden buildings referred to it has been exceedingly difficult during the past year to heat them and maintain the proper temperature. They are not rat proof, and are incapable of thorough disinfection. On this account epidemics occurred last spring among the laboratory animals which resulted in the loss of almost half of the stock. This loss from a monetary standpoint was considerable, and in addition it caused interruption to the experimental work.

For the above reasons the present frame structures should be demolished and their places taken by a new building constructed of brick and cement, so as to render it rat proof and capable of disinfection and proper heating. In view of these facts estimates were made and submitted providing for the construction of a stable and animal house on the reservation to cost \$25,000.

An estimate for grading and the construction of a retaining wall was also made, as such improvement is necessary in order to put the grounds of the Hygienic Laboratory in such condition as to make them in keeping with the buildings and surrounding properties. The grounds at the present time are unsightly, and there is necessity for the construction of a retaining wall on the east boundary of the reservation to prevent the caving in of the embankment on that side and resulting damage to the laboratory building itself. A low retaining

wall is also necessary for a portion of the western boundary of the reservation to prevent continued washings on that side. The southern portion of the reservation has a considerable slope, which is also subject to washings that can only be prevented by proper terracing. Such improvements will put the reservation in keeping with the adjoining reservation of the Navy Department.

While the laboratory now possesses unexcelled facilities for the investigation of infectious and contagious diseases and matters pertaining to the public health, all the space is occupied and there is already overcrowding. An additional wing will soon be required.

Personnel.—The personnel of the Hygienic Laboratory now consists of the director and assistant director, 3 chiefs of divisions, 8 commissioned medical officers, 2 pharmacists, 11 technical assistants, an artist, and 28 attendants, making a total of 55.

This number of workers is barely sufficient to handle the large volume of work involving investigations already undertaken. It is expected that the laboratory staff will have to be increased to meet the demands made upon it. Much of the work in the laboratory is of a routine and difficult nature, and its performance often requires considerable self-sacrifice, which has been made. The productiveness of the laboratory during the past fiscal year is shown in the reports and publications issued, and which are referred to elsewhere in detail.

Dangers of the work.—In the last ten years the laboratory has experimented much with some of the most virulent infections known and has worked with tetanus toxin, diphtheria toxin, and other strong poisons in wholesale lots. Fortunately no accidents have taken place. Particular record of this fact is made because it has always been a matter of concern to the director, who feels the responsibility for the safety of the personnel, as well as the efficiency of the work.

During the period mentioned two cases of typhoid fever have occurred which were in all probability contracted in the laboratory—Passed Asst. Surg. G. W. McCoy and Asst. Surg. William Whitfield Miller. Both of these officers at the time were working upon a large number of specimens of typhoid material. The case of Doctor Miller is particularly sad, as it resulted in death, cutting short the promise of a brilliant career. Doctor Miller had already distinguished himself by his first piece of research work. This consisted in the discovery of a new parasite (*Hepatozoon perniciosum*), the complete life cycle of which he unraveled.

The laboratory, a school of instruction for student officers and others.—Perhaps one of the most important functions of the Hygienic Laboratory is the training of student officers, health officers, and others in the fundamentals of the sanitary sciences. Since its conception the course of instruction has been greatly broadened and made much more practical. It now includes animal parasitology, with special reference to the public health; the chemistry of milk, water, and the detection of preservatives and adulterants; and pharmacology, with particular reference to the pharmacopœia and drug standardization. In cooperation with the city health officer and other departments of the Government it could of course readily be enlarged and widened so as to conform with the requirements and objects of the school for health officers proposed in the public-health bill now before Congress.

During the past ten years 37 service officers have either taken this course of instruction or have been awarded the facilities of the laboratory.

Journal club.—The journal club, which was organized in 1902, continued its seminars with few intermissions throughout the fiscal year. Attendance upon these meetings is entirely voluntary, but there is rarely an absentee.

The conferences have been stimulating and instructive and the officers have presented valuable reviews of the important articles which appear in the literature.

Cooperation with other branches of the government service.—Again this year, as in previous years, Dr. Ch. Wardell Stiles, Chief of the Division of Zoology, gave a course of lectures and demonstrations upon animal parasitology to the student officers of the army and the navy medical schools, and also to various educational associations.

The director of the laboratory repeated his course of lectures to the Naval Medical School upon the subjects of quarantine, antitoxins, vaccines, disinfection, immunity, and allied topics; and further, gave a course of lectures upon tropical diseases to the senior students of the Georgetown Medical School.

In other ways the laboratory cooperated with various branches of the government service, more particularly the Bureau of Animal Industry, Experiment Stations, Bureau of Chemistry, and the Bureau of Standards.

Scientific investigations.—The scientific work in the several divisions of the laboratory during the fiscal year has included the following: The investigations of viruses, serums, and toxins; preparation and distribution of the standard unit for antidiphtheric serum and the standard tetanus toxin; investigations of rabies and treatment of persons bitten by rabid animals; examinations of milk and water; investigations into the origin and prevalence of typhoid fever in the District of Columbia; studies of tuberculosis; investigations of foot-and-mouth disease; investigations of pellagra; testing of antiseptics and germicides; studies of anaphylaxis and immunity; examinations of pathological specimens; cooperation with the International Commission of Zoological Nomenclature; cooperation with the Bureau of Animal Industry; the preparation of the index catalogue of medical and veterinary zoology; determinations of zoological specimens; studies of hookworm disease and soil pollution; investigations of pharmaceutical preparations; research work in relation to digitalis; suprarenal preparations; thyroids; acetanilid mixtures and choline derivatives; cooperation with the Council of Pharmacy and Chemistry in the study of new remedies; chemical analyses, and chemical research.

Detailed reference has already been made to the work of the Hygienic Laboratory in relation to some of the above-mentioned investigations which have been discussed under appropriate headings. In addition it is necessary to refer in detail to the work of the several divisions.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

Examinations of viruses, serums, and toxins.—In addition to the testing of antidiphtheric serum, antitetanic serum, and vaccine virus a number of samples of antistreptococcic, antistaphylococcic, antigono-

coccic, antimeningococcic, and antiplague serums were examined in the laboratory under instructions from the bureau preliminary to the licensing of various firms for these products. As there is no acceptable standard at the present time for any of these sera they are only examined for purity and freedom from bacteriological or toxic contamination, amount of preservative, and correct labeling. If further results with antidysenteric and antimeningococcic sera should show that they are of undoubted therapeutic efficiency, efforts will be made in the laboratory to prepare a standard for these sera. The assistant director has studied the influence of concentration by the Gibson process upon the presence of tetanus toxin in blood serum. It has long been known that the blood serum of animals, during the period of incubation of tetanus, contains large amounts of tetanus toxin, and a study was undertaken to determine whether this toxin was eliminated by the Gibson process or whether it went with the antitoxic fraction. It was found that the latter was the case. A preliminary paper upon the subject was prepared and permission obtained from the bureau for its publication.

Antiseptics and disinfectants.—During the year a number of disinfectants were examined and reports made thereon. The examination of a large number of commercial disinfectants was undertaken in the laboratory by Passed Asst. Surg. G. W. McCoy, but on account of his detachment from the laboratory for duty in San Francisco this work was interrupted. His preliminary experiments showed that many of the commercial disinfectants which have a large sale are practically useless as disinfectants, and on account of the great public health importance of this fact it is hoped that this work may be completed during the ensuing fiscal year.

Examinations of water.—From July 1, 1908, to July 1, 1909, over 500 samples of city water were examined in connection with the study of the prevalence of typhoid fever in the District of Columbia. A number of samples of well, spring, and river water were examined upon request of the District health officer and various other persons.

It is intended during the ensuing year to make a study of the various organisms that are usually found in Potomac River water and to study the symbiosis of the typhoid bacillus with these various organisms isolated from the water; also, in connection with the study of typhoid fever in the District of Columbia, various methods will be employed in an effort to isolate the typhoid bacillus from the raw water.

Studies upon anaphylaxis and immunity.—During the year the director and assistant director continued their studies upon anaphylaxis and its relation to serum therapy, and the results of their studies were embodied in a manuscript for publication in the month of April.

It was found that the various proteins, when dried, could be heated to high temperatures without affecting to any appreciable degree their anaphylactic properties. This bulletin is the fourth one submitted by these authors upon the subject of anaphylaxis, a subject which has received wide notice.

Examination of pathological specimens.—A number of pathological specimens were submitted to the laboratory by various service

stations for examination and report. Reference is again made to the great importance of officers sending specimens to the laboratory for determination, for two reasons: (1) The laboratory is entirely dependent upon outside sources for its pathological material; and (2) the examination of these specimens is of much benefit to the officers who are at the laboratory undergoing special instruction.

Experimental pathology.—Studies in the line of experimental pathology have been crowded into the background by the press of work in bacteriology, serum therapy, and allied topics. Pathology, from the chemical and experimental side, offers a large field of research having reference to public health work, and should be given more consideration than has heretofore been possible. The director recommends that one or two of the younger officers of the service who show an inclination in this direction be permitted to take a course of instruction in this subject at Baltimore, Boston, and New York for the purpose of carrying on this work in the laboratory.

Miscellaneous reports and papers.—In addition to the bulletins covering research work done in the Division of Pathology and Bacteriology the following shorter articles have been published on work done in this division:

“Further studies upon anaphylaxis,” by M. J. Rosenau and John F. Anderson. (Journ. Med. Res., July, 1908, p. 37.)

“Special report—preliminary note of a new pathogenic hemogregarine, *Hepatozoon perniciosum*, found in white rats in Washington, D. C.,” by William W. Miller. (P. H. R., vol. 23, July 24, 1908, p. 1070.)

“What is meant by a disinfectant and how to avoid contamination,” by John F. Anderson. (Proc. 5th Ann. Confer. Embalmers’ Exam. Boards, Oct. 2, 1908.)

“Recent advances in the study of typhoid fever,” by M. J. Rosenau. (Proc. Am. Scientific Congr., Santiago, Chile, Dec. 25, 1908.)

“The viability of the tubercle bacillus,” by M. J. Rosenau. (Proc. Internat. Cong. Tub., Washington, 1908.)

“The amount of infection and reasonable sanitary standards,” by M. J. Rosenau. (Journ. Am. Med. Assn., vol. 52, Jan. 9, 1909, p. 128.)

“Further studies upon the phenomenon of anaphylaxis,” by M. J. Rosenau and John F. Anderson. (Journ. Med. Res., Vol. XXI, 1909, p. 1.)

“Thermal death points of milk bacteria and other effects of heat upon milk,” by M. J. Rosenau. (Pediatrics, N. Y., vol. 20, Sept., 1908.)

“Report of a case of hydrophobia,” by John F. Anderson and Joseph Goldberger. (Med. Rec., June, 1909.)

“The Public Health and Marine-Hospital Service,” by M. J. Rosenau. (Med. Rec., Apr. 24, 1909.)

“Federal control of the manufacture of therapeutic sera,” by John F. Anderson. (Am. Journ. Pharm., vol. 81, Apr., 1909, p. 181.)

“The relative proportion of bacteria in top milk and bottom milk and its bearing on infant feeding,” by John F. Anderson. (Journ. Infec. Dis., vol. 6, June 12, 1909, p. 392.)

“The influence of the ingestion of dead tubercle bacilli upon infection,” by M. J. Rosenau and John F. Anderson. (Journ. Infec. Dis., vol. 6, June 12, 1909, p. 387.)

"The prevalence of pellagra in the United States—a statistical and geographical note, with bibliography," by C. H. Lavinder, C. F. Williams, and J. W. Babcock. (P. H. R., vol. 24, June 18, 1909, p. 849.)

THE DIVISION OF ZOOLOGY.

The Division of Zoology of the Hygienic Laboratory was established on August 1, 1902, when Dr. Charles Wardell Stiles was appointed chief of the division. At the time of the appointment the Hygienic Laboratory was not fully completed and equipped, so that the work of the division was carried on in the laboratory of the Division of Zoology of the Bureau of Animal Industry of the Department of Agriculture. On June 1, 1903, the division moved to the third floor of the Georgetown Medical School, where it remained until the completion of its permanent quarters in the Hygienic Laboratory in March, 1904. Upon completion of the new extension of the laboratory in 1909, the division again moved into its present quarters in the central part of the first floor.

Since the organization of the division its most striking work has been in the study of uncinariasis (hookworm disease) in the South Atlantic States. Bulletin No. 10 gives the result of the first adequate study of this disease in the United States, when a prolonged trip was made by the chief of the division through the South in 1902. Since then the division has been in constant communication with Southern State boards of health and numerous physicians, aiding in the spread of the knowledge, cure, and prevention of this disease.

The presence of intestinal parasites among the insane has been determined and reported in Bulletin No. 13. About 4,000 patients were examined in various hospitals with interesting results.

Owing to the large number of specimens of *Hymenolepis nana* and its allied species that were being constantly sent in to the division for identification, Bulletin No. 18 was prepared, showing the prevalence of this parasite in the United States.

The finding of *Opisthorchis sinensis* and *Paragonimus westermanii* in the Pacific States called the attention of this division to the possibility of trematode diseases in the United States. As a result Bulletin No. 17 was prepared, being an "Illustrated key to the trematode diseases in man."

In 1904 the Chief of the Division of Zoology spent some time in Bitter Root Valley making a zoological study of the etiology of the "spotted fever" and reported his conclusions in Bulletin No. 20. He was unable to substantiate the piroplasma-tick-spermophile theory.

The confusion resulting from the nomenclatural difficulties is of scientific international importance. The chief of this division has been secretary of the International Commission on Nomenclature and has aided in straightening out many difficulties. In Bulletin No. 24 the subject of nomenclature according to the international code is explained.

Since the division is continually receiving specimens for determination, new undescribed parasites are frequently found. These have been reported in various bulletins. Bulletins Nos. 34 and 40 contain a collection of new parasites. The *Sparganum proliferum*, reported

only once before, is not thoroughly understood and may prove of some importance to the southern coast States.

One of the most important features of the work of this division is the publishing of the Index Catalogue of Medical and Veterinary Zoology, which work is done in conjunction with the Bureau of Animal Industry, Department of Agriculture. The author's catalogue through the letter "R" has been completed and the remainder is about ready for the press. The Trematodes and trematodes diseases, part of the subject catalogue, was published as Bulletin No. 37 of this laboratory. At present the cestodes are written and about ready for publication and the manuscript of the nematodes is nearing completion.

The present work of this division consists largely in completing several manuscripts. One on the subject of child and women labor in the southern cotton mills; one on the subject of new Paramphistomidæ; one on the subject of ticks, some new forms, and a new and more specific method of determination and classification. Work has been started on a key to the trematodes. This key will be based on a new method. The preliminary work for a paper on the animal parasites of the rat has been completed.

The routine work of the division consists in indexing for the catalogue of Medical and Veterinary Zoology and the distribution and arrangement of cards in that catalogue; of typewriting the manuscript of the nematodes; of filing reprints in the division's library; of determination of specimens sent into the division by state boards of health, physicians, and others; and the care of the helmenthological collection.

In addition to the medico-zoological studies on child labor, the tenant whites, and other duties mentioned elsewhere, the Division of Zoology has been making studies in more restricted zoological lines. Among these may be mentioned: A study of certain North American ticks (Ixodoidea), which come into consideration as carriers of disease; the anatomy and classification of the amphistome parasites; and the possibility of a key (arranged on a card catalogue system) to the complex group of the distomes. This latter study is something of a departure in methods of determining animals, and the final results are not ready for publication, as the system must first be given a rigid trial.

International commission on zoological nomenclature.—Cooperation with the international commission on zoological nomenclature has been continued through the Hygienic Laboratory, the Chief of the Division of Zoology serving as secretary of the commission. A number of cases have been submitted during the year for interpretation under the code.

Index catalogue of medical and veterinary zoology.—Through the Division of Zoology of the Hygienic Laboratory, cooperation has been continued with the Zoological Division of the Bureau of Animal Industry in the preparation of an index catalogue of medical and veterinary zoology. Of the authors' catalogue, the letters A to Q, inclusive, have been published. The letters R and S have been forwarded for publication, and the letters T to Z are being prepared for the printer.

Of the subjects, the preliminary draft of the *Cestoda* and part of the *Nematoda* has been typewritten, but it is planned not to print these parts until the authors' catalogue is completed.

Determination of zoological specimens.—The Division of Zoology has continued to make zoological determinations of animal parasites for physicians, boards of health, etc., and a large number of such determinations, including many fecal examinations as aid in diagnosis, have been made.

Public lectures on soil pollution in the South.—In order to awaken popular interest on the subject of soil pollution in connection with hookworm disease, and without any expense to the Government, the chief of the division of zoology has given 25 popular and technical lectures on this subject before the following organizations:

Virginia:

Charlottesville—

Four lectures before the University of Virginia.

Richmond—

One lecture before the Richmond Academy of Medicine.

One lecture before the Board of Education of the Methodist Episcopal Church, South.

Hampton—

One lecture before the Hampton Industrial Institute.

North Carolina:

Greensboro—

One lecture before the State Negro Agricultural College.

Charlotte—

One lecture before the North Carolina Medical College.

Mebane—

One lecture before Bingham School.

Raleigh—

One lecture before the State Agricultural College.

One lecture before Shaw University (negro).

One lecture before the Negro Normal School.

South Carolina:

Columbia—

One lecture before the training school for nurses of the Columbia Hospital.

One lecture in the Cotton Mill Church.

One lecture before the University of South Carolina.

Alabama:

Mobile—

Three lectures before the Medical Department of the University of Alabama.

Louisiana:

Four lectures before the Medical Department of Tulane University.

One lecture before the training school for nurses of the Charity Hospital.

One lecture before the Negro Medical College of New Orleans.

DIVISION OF PHARMACOLOGY.

In response to demands made upon it, and with the approval of the Secretary of the Treasury, there has been an extension of the work of the Division of Pharmacology, and the staff of the workers was correspondingly increased. In the summer and autumn of 1908

Drs. Motter, Wilbert, Schultz, and Hale were appointed as technical assistants, and their duties have related largely to the work in connection with the pharmacopœia. Through special arrangement, and in accordance with the provision of the Civil Service Commission, Dr. C. W. Edmunds, of the University of Michigan, had an appointment as special temporary assistant in the summer of 1908, and Professor Lovelace, of the University of Alabama, and Professor Hatcher, of Cornell, received similar appointments in the summer of 1909. These special temporary appointments have proven of much value, not only on account of their providing workers on special subjects, but also because of the large amount of work accomplished and the relations they establish between the laboratory and some of the leading universities.

As is shown elsewhere, much work has been devoted to the study of pharmacopœial preparations, and the compilation of literature relating thereto. This compilation is being edited and published as digests of comments on the pharmacopœia, one volume having already been published as Hygienic Laboratory Bulletin 49, and their value is fully attested by the medical and pharmaceutical journals in this and other countries. This is perhaps the most extensive work ever undertaken in connection with any pharmacopœia, and will prove of great value in the revision to be undertaken.

Research work.—Research work has been done on the following subjects: Standardization of digitalis preparations—the various methods which have been used for the physiological standardization of digitalis were compared and all of the leading preparations on the American market tested. The results are published as Bulletin No. 48.

Analytical methods.—It was found that none of the methods in use for determining salicylates are accurate; much work was done in devising a new method. Especial attention was given to methods applicable to the salicylates of the pharmacopœia. Much work was also done on the solubilities of compounds in the United States Pharmacopœia, and at present work is in progress on the boiling and melting points of these compounds.

Suprarenal preparations.—The physiological methods for standardizing suprarenal preparations were critically examined and modified so as to render them more accurate. The toxicity and physiological activity of a number of synthetic compounds of the adrenalin series were investigated. Synthetic suprarenin was found to have but little more than half the activity of the natural product. The manuscript of a bulletin on this subject was submitted in April.

Thyroid.—Work on commercial preparations of thyroid was continued. Especial attention was given to the relation of the iodine to the physiological activity; a bulletin (No. 47) on this subject was published.

The investigations on thyroid are the first of sufficient exactness to show an unmistakable parallelism between the iodine content of thyroid preparations and their physiological activity. The new method which has been devised is based upon the resistance to a definite poison, acetonitrile, produced in white mice by feeding appropriate amounts of thyroid or preparations of this gland for a period of about ten days. The degree of the resistance, which is a measure of the physiological activity, was found to be proportional to the quan-

tity of iodine present as thyroid iodine in the preparation administered. In the case of experiments with other poisons than acetonitrile entirely similar results were obtained. With animals other than white mice, viz, white rats and guinea pigs, the administration of the thyroid produced, instead of a greater resistance to the poisons, an increased susceptibility which was proportional to the amount of iodine administered in proper thyroid combination. All of the experiments, therefore, lead to the conclusion that the amount of the iodine in combination with the thyroid is a measure of the activity of the gland and its determination forms a rapid and satisfactory method for the standardization of thyroid preparations.

Solubilities of pharmacopœial compounds.—The determinations of the solubilities of pharmacopœial compounds have been carried on in the Division of Pharmacology with the object of supplementing and correcting the solubility data in the United States Pharmacopœia. The solubilities are being determined by Dr. Atherton Seidell, who has had much experience in such work, and he has recently compiled a handbook entitled "Solubilities of Inorganic and Organic Substances," which has been found of much assistance in rendering the data appearing in the literature available for correcting the statements of the pharmacopœia, and furthermore for pointing out the particular compounds for which the available data is of least reliability.

The laboratory experiments have been carried on as time could be obtained from other lines of investigation. However, the director of the laboratory reports that determinations have been so far completed and most of them published upon the following compounds: Ammonium iodide, acetanilide, phenacetine, boric acid, camphoric acid, benzoic acid, salicylic acid, and the salicylates of ammonium, lithium, sodium, phenyl, strontium, bismuth, and quinine. The benzoates of the pharmacopœia are being studied at the present time. The determinations are given for water and ethyl alcohol and mixtures of the two. The results will be brought together in bulletin form when the work upon the several groups, or nearly related compounds, is completed.

Toxicity of acetanilide mixtures.—The reputed antidotal action of caffeine and sodium bicarbonate toward acetanilide and antipyrine was thoroughly tested experimentally. The results, which have important bearings upon the use of these substances in proprietary and other headache remedies, were submitted as a bulletin in April.

Choline derivatives.—A very extensive (nearly 100) series of new compounds of the choline type were made and the general laws governing their toxicity investigated. Some of these made are very active physiologically and give promise of being of use in therapeutics; others are closely related to substances occurring normally or abnormally in the body and may prove of interest in this connection.

Miscellaneous analyses and reports.—A number of samples of drugs were examined and assayed for the purveying depot. Some pills, reputed to be of value in treating the opium habit, were examined for the International Opium Commission; they were found to contain opium and arsenic. A number of samples of smoking opium, opium ash, etc., were assayed for morphine for the chief health officer of the Philippines. An examination of a preparation claimed to be a solution of mercuric iodide in oil was made; no mercuric iodide was

found. A careful comparison of two widely used brands of ether was made. A considerable amount of other miscellaneous work was done.

Cooperation with the American medical and American pharmaceutical associations.—Members of the staff have taken an active part in the work of these two organizations. Two members, and also Doctor Hatcher, who had a temporary appointment for the summer, are members of the council on chemistry and pharmacy. Mr. Wilbert is a member of the committee of the American Pharmaceutical Association to revise the National Formulary; he is also secretary of the section on scientific papers. The chief of the division was chairman of the section on pharmacology and therapeutics; he was also chairman of the committee on the United States Pharmacopœia and a member of the committee on medical research defense; he is also a member of the committee of the American Pharmaceutical Association on the United States Pharmacopœia. Doctor Motter is secretary of the section on pharmacology and therapeutics and Mr. Wilbert vice-chairman. Doctor Motter is secretary of the board of trustees of the United States Pharmacopœial Convention.

Publications and scientific communications.—The following is a complete list of the scientific reports and communications prepared during the year:

“The reaction of the mammalian pupil to adrenalin.” (Proc. Soc. Exp. Biol. and Med., Oct., 1908.)

“Studies on thyroid.” (Bulletin No. 47.)

“The physiological standardization of digitalis.” (Bulletin No. 48.)

“Howell’s mercol.” (J. A. M. A., 1909, lii, 225.)

“The detection of mercuric iodide in petrolatum.” (Amer. Chem. Soc., Dec., 1908.)

“A comparative study of biological assay methods for digitalis.” (Pharmaceutical section, American Chemical Society, Baltimore, 1908.)

“Methods for the determination of salicylates.” (Seventh International Congress of Applied Chemistry, London, 1909.)

“The solubilities of the salicylates of the United States Pharmacopœia in aqueous alcohol solutions at 25° C.” (Seventh International Congress of Applied Chemistry, London, 1909.)

“The toxicity of acetanilide mixtures.” [In press.]

“Digests of comments on the United States Pharmacopœia for 1905.” (Bulletin No. 49.)

“The effect of certain drugs upon the toxicity of acetanilide and antipyrine.” [Bulletin in press.]

“Quantitative studies on adrenalin and related bodies.” [Bulletin in press.]

“The relation between the toxicity and chemical constitution of a number of choline and analogous compounds.” (To appear in the Journal of Pharmacology and Experimental Therapeutics.)

“What the individual physician can do to improve the *Materia Medica*.” [In press.]

“Some problems of pharmacopœia revision.” (Chairman’s address, section on pharmacology and therapeutics, American Medical Association, June, 1909.)

DIVISION OF CHEMISTRY.

The Division of Chemistry was permanently organized June 20, 1905, when Dr. Joseph H. Kastle was appointed chief of that division. During the greater part of the time since that date the chemical laboratory occupied two rooms in the west end of the first floor of the building, with the result that it was considerably cramped for space. On April 19, 1909, the division was moved into its new quarters in the new addition to the Hygienic Laboratory and at present occupies nine rooms in the east end of that building. During the year expert opinions and reports have been rendered on the following subjects:

Plans and estimates for the installation of a vacuum and compressed-air plant for the Hygienic Laboratory.

Outline of work done in the Division of Chemistry of the Hygienic Laboratory from the date of its organization, June 20, 1905, to September 9, 1908.

On the possible injurious effect of small quantities of sulphur dioxide and sulphites ordinarily present in commercial gelatine, with reference to the use of this material in the preparation of culture media for bacteriological work.

Portable ice machines and the preservation of vaccine virus in the Tropics.

On the excretion of drugs and poisonous substances in milk and possible dangers to the suckling from intoxication resulting therefrom.

Publications relating to public water supplies.

On the humidity of the atmosphere in its relation to disease.

On the effect of smoke on the mortality in manufacturing centers.

On the enzymes of milk.

Milk poisoning.

Analytical work.—The analytical work of the Division of Chemistry for the past year has included the analyses of 13 samples of water, 4 samples of milk, 18 samples of drugs, and 12 samples of miscellaneous substances. In connection with the investigation of typhoid fever in the District of Columbia, daily turbidity determinations have been made on the filtered water supplied the city of Washington during the months of May, June, July, August, and September, 1908.

Laboratory demonstrations covering a period of one week have been given during the past year to the officers of the United States Public Health and Marine-Hospital Service stationed at the Hygienic Laboratory, on the subjects of milk and sanitary water analysis.

Chemical research.—During the past year chemical research has been carried on in the following subjects:

1. Fuchsin S as a permanent standard for the determination of nitrites in sanitary water analysis.

2. On mineral metabolism, especially on the relation of the alkali metals, sodium and potassium, to chlorine.

3. An inquiry into the subject of carbon monoxide poisoning, and studies on the oxidation of this substance, with the object of discovering a suitable antidote therefor.

4. Chemical tests for blood and pus, and a method whereby 1 part of blood at a dilution of 80,000,000 can be recognized.

5. A new colorimeter, and studies in colorimetry.
6. On the decomposition of the leucosulphonic acids of certain of the aniline dyes.
7. The preparation and stability of the various modifications of sodium sulphite.
8. A general method for the quantitative estimation of alkaloids.

Publications and scientific communications.—The following publications and scientific communications embodying the results of the investigations carried on in the Division of Chemistry during the past year have been published in the form of laboratory bulletins or as special articles in various scientific journals:

1. "Peroxidase accelerators and their possible significance for biological oxidations." (Am. Chem. Jour., 40, No. 3, Sept., 1908, pp. 251–266.)
 2. "On the use of nitrous acid, nitrites, and aqua regia in the determination of the mineral constituents of urine." (Am. Jour. of Physiol., Vol. XXII, Sept. 1, 1908, No. IV, pp. 411–422.)
 3. "Tests for pus and blood." (Proc. Soc. Biol. Chem., XCVI–XCVII, Dec., 1908.)
 4. "The oxidation of carbon monoxide." (Proc. Soc. Biol. Chem., Dec., 1908.)
 5. "Fuchsin S as a permanent standard for the determination of nitrites in sanitary water analysis." (Proc. Internat. Cong. of App. Chem., Lond., May 27 to June 2, 1909.)
 6. "Chemical tests for blood." (Bull. 52, Hyg. Lab.) [In press.]
 7. "On the decomposition of the leucosulphonic acids of rosanilin hydrochlorid and crystal violet, in aqueous solution." [In press.]
- The following communications, intended for publication as bulletins of the Hygienic Laboratory or in the American Chemical Journal, are in preparation:
1. "The oxygen-carriers of the living organism."
 2. "Methods of sanitary water analysis."
 3. "A new colorimeter and studies in colorimetry."

BULLETINS OF THE HYGIENIC LABORATORY.

The scientific investigations of the service are well represented by the bulletins prepared and published during the fiscal year or now in press. During the fiscal year the following bulletins were prepared and published:

Bulletin No. 47.—"Studies on thyroid." This publication deals with the relation of iodine to the physical activity of thyroid preparations. Studies were made to determine the physiological activity of different thyroid preparations by a method which has for its basis the effect of thyroid feeding upon the resistance of animals to certain poisons. The drugs used were acetonitrile and morphine. Some of the experiments made show a close parallelism between the iodine content of the thyroid and its physiological activity, as measured by its effect in diminishing the resistance of rats to acetonitrile. Other experiments showed that thyroid rich in iodine is more active than thyroid poor in iodine simply on account of the iodine; in other words, that the iodine is the cause and not the result of the activity.

Bulletin No. 48.—"The physiological standardization of digitalis." In this bulletin the literature relating to the standardization of digi-

talis is reviewed, and it is pointed out that the chemical assay is impractical on account of an imperfect chemical knowledge of the drug's active constituents. The biological method of assay is the more accurate, but there is no uniformity as to the manner in which this has been carried out. The authors, in testing these methods, state that the lack of absolute uniformity in their results was to be expected, as in one case the effect might be upon one organ and in another upon an entirely different one. Since an action upon the heart corresponds to the use of the drug in medicine, this effect should be adopted as an end reaction, and frogs are suggested as being the most suitable animals.

A second part of the bulletin deals with the variability of nine different commercial preparations, which varied in a ratio of 214 to 850, while one preparation had a depressant, not a tonic, action upon the heart.

Bulletin No. 49.—"Digest of comments on the Pharmacopœia of the United States of America." The Federal status given the United States Pharmacopœia by the food and drugs act of June 30, 1906; the treaty, entitled an "Agreement between the United States and other powers respecting the unification of the pharmacopœial formulas for potent drugs," of November 29, 1906, and the increasing demands of medical and pharmaceutical science, have made necessary a more thorough and complete study of medicaments as to their identity, purity, strength, and standardization. This bulletin collates from the scientific literature of the world data as to pharmacopœial substances necessary for their intelligent use. Aside from its practical value to the medical officers and pharmacists of the service, it will afford teachers, and especially the revisers of the pharmacopœia, material much of which is otherwise inaccessible. In the forthcoming convention for the revision of the pharmacopœia the service will, as heretofore, be represented, and will present a standard for antitetanic serum, supplementing its earlier contribution to the pharmacopœia on the subject of antidiphtheritic serum.

Bulletin No. 50.—"Further studies upon the phenomenon of anaphylaxis." Attention is especially given to the intimate nature of the factors that make up the phenomenon of anaphylaxis, subordinating for the time being discussions of the theory of its mechanism for its practical application. Special studies were made upon the influences of hypnotic substances in preventing anaphylactic shock and also upon the effect of heat upon the sensitizing and poisonous proteins, etc.

Bulletin No. 51.—"Chemical tests for blood." The object of this bulletin is to give a complete chronological account of those chemical tests for blood which depend upon its oxygen-carrying power, together with the results of considerable experimental work recently carried out in the Division of Chemistry of the Hygienic Laboratory on the use of phenolphthalin as a reagent for blood, whereby it is possible under the most favorable conditions to recognize one part of blood at a dilution of 80,000,000. One section of the bulletin deals with the nature and general theory of the color tests for blood; another section is devoted to the consideration of substances likely to interfere with the test; another to the delicacy of the chemical tests for blood; another to the value of the chemical tests in forensic investigations and clinical work. The experimental part of the work

includes the preparation and stability of the phenolphthalin reagents and their conduct toward blood under a great variety of conditions, the delicacy of the phenolphthalin test, quantitative measurements, the effect of various animal tissues on the oxidation of phenolphthalin by blood, the absorption of blood pigment by various colloidal substances, and the utilization of the phenolphthalin reagent in the examination of pathological fluids and suspected stains for blood. The last section of the bulletin consists of a bibliography containing 213 references to the original literature of the subject.

Bulletin No. 52.—"Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908)." This bulletin calls attention to the results obtained during the third year of study of typhoid fever in the District of Columbia, and comprises an epidemiological investigation of all cases of typhoid fever reported from May to November. An intensive study was made of 32 city blocks, containing a population of 5,300 persons. Also a special search was made for bacillus carriers in this area. Specimens of feces were collected from about 1,000 healthy persons and examined for the presence of the typhoid bacillus.

Dr. L. O. Howard made a study of the fly abundance. Particular attention was again given to the city water supply, milk, contacts, imported cases, etc. The conclusions, found at the end of the volume, summarize the status of the problem at the date of publication of the bulletin.

Bulletin No. 53.—"The influence of certain drugs upon the toxicity of acetanilide and antipyrine." This bulletin takes up the question of antagonism between acetanilide and antipyrine and certain drugs commonly found in "headache mixtures." The history of the introduction of such mixtures into medicine is discussed and this is followed by experimental data. The heart effect was determined for frogs and dogs and the general toxicity to the intact animal upon guinea pigs and mice. The experiments show that the deleterious effect of acetanilide and antipyrine upon the heart is increased by caffeine but lessened by sodium bicarbonate. If given to the intact animal their toxicity is greater when given with caffeine or the opium alkaloids, but somewhat less when given with sodium bicarbonate. The toxicity of acetanilide or antipyrine when administered with the salicylates or bromides is not changed. The toxicity of salipyrin, a chemical combination of antipyrine and salicylic acid, is shown to be the same as its uncombined constituents.

Bulletin No. 54.—"The fixing power of alkaloids on volatile acids and its application to the estimation of alkaloids with the aid of phenolphthalin or by the Volhard method." This bulletin deals with the subject of estimating alkaloids (the active principles of drugs). It is shown that all the old methods available for this purpose are very unsatisfactory. A new method is therefore proposed, which is proven experimentally to yield closer results and which is also very simple and easily carried out.

Bulletin No. 55.—"Quantitative pharmacological studies—adrenalin and adrenalin-like bodies." This bulletin deals with the determination of the strength of adrenalin, a comparatively new and valuable organo-therapeutic product now upon the market, but varying in the widest possible degree in therapeutic efficiency. A modified method of pharmacological assay of adrenalin is presented by the

author, which should be known to pharmacologists engaged in public-health work and manufacturing industries.

Bulletin No. 56.—"Milk and its relation to the public health." This is a revision of Bulletin No. 41, relating to milk, which has had a wide demand, which is now used as a text-book in many of the colleges of the country, and which is recognized as the leading authority on milk in its relation to the public health. The first edition has long since been exhausted; there is demand for a revised edition, and the manuscript has been prepared by direction of the Secretary of the Treasury as a result of the demands.

THE ADVISORY BOARD OF THE HYGIENIC LABORATORY.

A meeting of the advisory board of the Hygienic Laboratory was held at the bureau March 26, 1909, the following members being present: Maj. Walter D. McCaw, Dr. A. D. Melvin, Dr. Victor C. Vaughan, Dr. Wm. H. Welch, Dr. Frank Westbrook, and Surg. M. J. Rosenau. On account of the subjects to be considered, the following officers were also present: Asst. Surg. Gen. J. W. Kerr, Passed Asst. Surg. John F. Anderson, Dr. J. H. Kastle, Passed Asst. Surg. C. H. Lavinder, and Passed Asst. Surg. L. L. Lumsden.

In calling the meeting to order, the Surgeon-General stated that there were a number of subjects upon which the advice of the board was desired, and that the officers connected with the work to be considered were present in order that they might make clear some of the subjects under discussion, and benefit from hearing the same.

The first subject considered was pellagra, to which reference has been made elsewhere in this publication. Doctor Lavinder briefly reviewed the work already done on the subject, and outlined tentative plans for future investigations. In connection with these investigations, he mentioned the clinical and bacteriological studies, and stated that they could only be carried on where the disease was prevailing, as at Columbia, S. C. It was the consensus of opinion of the board that the investigations should be made, that Doctor Lavinder should be sent at once to study the cases in the South, and later go to Europe in order to make comparative studies of the disease in Italy and other countries as compared with pellagra in the United States.

A prepared statement of events in connection with a recent outbreak of foot-and-mouth disease in the United States was presented to the board with the view to obtaining its opinion as to the action taken and as to the methods to be adopted in future investigations of this subject. This statement set forth the origin of infection, its relation to vaccine virus, the steps taken to free vaccine virus of the infection, and to recall all presumably infected virus from the market. It was also explained that special facilities were being made for routine examinations of all vaccine virus sold under government license with the special object of determining its freedom from the infection of foot-and-mouth disease.

Proposed regulations were submitted for suggestions as to changes or additions, which regulations had been prepared with the special view to safeguarding the purity of vaccine virus. The regulations as finally issued appear elsewhere in this publication.

The subject of a second edition of Bulletin No. 41, entitled "Milk and Its Relation to the Public Health," was also brought to the at-

tention of the board. It was explained how the first edition came to be published, the demand that it had, and the criticisms that had been made of it. At the same time it was stated that if there were any criticisms or omissions or additions which the members thought should be put in the revision their suggestions would be much appreciated and used.

The third season's investigations of typhoid fever in the District of Columbia were then outlined by the chairman of the typhoid fever board, this board having been appointed by the Surgeon-General July 2, 1906. The investigations of 1908 had been in line with suggestions made by the advisory board and the summary of the season's findings were therefore presented.

It was the consensus of opinion of the advisory board that the investigations should be continued and the work proposed was therefore discussed in detail. It was believed that the epidemiological studies should include all cases reported in the calendar year; that the collection and examination of specimens of blood, feces, and urine from about 200 cases of typhoid should be reported serially, with the view to determining the percentage of cases reported under mistaken diagnoses; that there should be collected for examination specimens of blood, feces, and urine of about 1,000 persons who had had typhoid fever in the District of Columbia during the past five years; that further bacteriological studies of Potomac River water should be made; that a special study of the bacteria usually present in the Potomac River water should be made with the view to determining their symbiotic relation to the typhoid bacillus; and that studies be made to determine the viability of the typhoid bacillus under different conditions in the District.

STATE AND INTERNATIONAL RELATIONS.

SEVENTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH AUTHORITIES WITH THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

In accordance with section 7 of the act of Congress approved July 1, 1902, the seventh annual conference of health authorities with the Public Health and Marine-Hospital Service was held at the bureau June 2, 1909. Twenty-six States and Territories and the District of Columbia were represented by delegates. A number of important subjects received attention. The results of investigations into the geographical distribution of rabies in the United States during 1908 were presented to the conference, and it was decided after discussion that some definite steps should be taken to ascertain the measures necessary for the control of the disease. A committee was accordingly appointed for the purpose, Passed Asst. Surg. John F. Anderson being designated as its chairman.

In view of the Second International Congress Against Leprosy, which had been called to meet in Bergen, Norway, August 19-21, 1909, there were discussed measures taken against leprosy in the United States since 1902. Reports had previously been received from the state and territorial health authorities upon this subject, and the data had been embodied in a report intended for presentation at the congress. The purpose of presenting the question of leprosy before the conference therefore was to elicit the views of the state and territorial health authorities on the question of the segregation of lepers as a means of controlling the disease. A committee was appointed, consisting of Drs. H. M. Bracken, Joseph Y. Porter, and J. N. Hurty, to prepare resolutions relative to the national care of lepers in the United States.

The investigation and control of typhoid fever was also the subject of discussion, and Passed Asst. Surg. L. L. Lumsden, acting chairman of the typhoid fever board of the service, presented a review of the investigations made in the District of Columbia and the results accomplished.

The movement for the organization of colored antituberculosis leagues throughout the United States was brought to the attention of the conference, with the object of enlisting the interest of state and territorial health authorities. It was explained by the Surgeon-General that the movement was not being carried on under official auspices, but that the service was doing what it could to foster it, and he suggested that it might be utilized by the state and territorial authorities as a powerful means of extending the campaign against tuberculosis among a class of citizens who are especially prone to the disease.

The necessity of taking measures against hookworm disease was the subject of discussion, and Dr. Ch. Wardell Stiles, Chief of the Division of Zoology of the Hygienic Laboratory, outlined his studies of hookworm disease in the Southern States, especially in relation to the child-labor problem, and emphasized the importance of instituting measures against the disease as the primary means of uplifting certain classes of the white population in the South which he believed had been submerged as a result of the ill effects of this intestinal parasite.

The conference was advised of the events in connection with the contamination of vaccine virus with foot-and-mouth disease and the steps taken to eradicate the infection from licensed establishments, as well as to clear this product of all suspicion.

Finally, the important subject of pellagra received attention, and Dr. C. F. Williams, secretary of the state board of health of South Carolina, presented the results of a statistical and geographical study of the prevalence of this disease in the United States. He presented records to show that there were approximately 1,000 cases of pellagra scattered in 13 States. It was made apparent in the conference that it was necessary to secure complete and reliable statistics regarding pellagra, as it was becoming a matter of national concern. Dr. H. F. Harris, secretary of the state board of health of Georgia, who had reported a case of the disease several years previously, stated that pellagra had increased in a remarkable manner in the South with the last two or three years, and he thought that 15,000 would be a very conservative estimate of the number of cases that had occurred.

Great interest was manifested in the work of the conference, and the results accomplished are evidence of the good effect of the law which authorized them.

INTERNATIONAL OFFICE OF PUBLIC HYGIENE, PARIS.

In the annual report for 1908, on page 89, there appears an outline of the measures taken looking to the organization of an international office of public hygiene at Paris, together with a copy of the arrangement and organic statutes to govern the same, signed at Rome, December 9, 1907. In pursuance of this arrangement, the international committee provided for therein convened at the ministry of foreign affairs in Paris on November 4, 1908. This meeting represented the last step taken to organize the above-mentioned office. The meeting was composed of one representative from each of the contracting powers whose Governments had ratified the arrangement signed at Rome. Its duty was to actually create the office, draw up its regulations, provide for its expenses, and direct its first operations. The representative of the United States at this meeting was Passed Asst. Surg. S. B. Grubbs, of the Public Health and Marine-Hospital Service.

Officers and committees.—After the details of the office and its work had been considered and agreed upon, using the organic statutes as a basis, Mr. Jacques de Cazotte, minister plenipotentiary of the French diplomatic corps, was chosen director, and Doctor Pottevin, for several years the chief sanitary officer of the city of Havre, France, was chosen secretary-general of the office. The qualifications of these officers will enable them to inaugurate a valuable sys-

tem for the collection and diffusion of information regarding the graver epidemic diseases.

The real control of the office of public hygiene, however, lies with the permanent international committee, the members of which must keep in touch with the office at all times in order that they may be able to decide intelligently the questions which will from time to time arise. On account of this necessity Surg. H. D. Geddings, who had previously been assigned to duty in Europe, was designated as the delegate of the United States on the international committee, Passed Asst. Surg. S. B. Grubbs having been relieved of this duty on account of change of station.

Expenses.—Twelve countries having ratified the agreement signed at Rome, the expenses of the office, apportioned under the financial arrangement agreed upon, represented 220 units, of an annual expense of 150,000 francs. The United States being in the first category, pays 25 units, and the necessary appropriations have been made by Congress in accordance with estimates submitted by the Department of State. Three thousand dollars have been appropriated for the year 1909.

Operations.—The foundations of the international office of public hygiene have been laid as for an institution that is to be permanent. In organization it resembles the permanent International Postal Bureau and the Bureau of Weights and Measures, but in the field of sanitation it is original, being the result of long and preserving collaboration by men who believe that the greatest international publicity in sanitary matters is the first and most important step toward perfect sanitary control. The organic statutes authorizes direct communication with the principal health authorities of the participating Governments, and the Bureau of Public Health and Marine-Hospital-Service has, therefore, been called upon to furnish from time to time all important sanitary facts with respect to the United States in order that the committee and officers of the office may accomplish the end for which the office was established. The current sanitary reports and statistics are therefore being forwarded, the Bureau of the Census has been requested to forward reports relating to mortality and the several state and territorial health authorities have been requested to forward reports of sanitary conditions within their jurisdictions.

An outline of the general sanitary organization is being prepared, and will be furnished to the international office, together with copies of sanitary laws and other data bearing upon the public health.

As showing the organization of the international office of public hygiene, as well as its international committee of control, the following regulations are of value:

REGULATIONS OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE.

REGULATION OF THE INTERNATIONAL COMMITTEE.

ARTICLE 1. The committee of the international office of public hygiene meets in ordinary session during the course of the month of October of each year. A second session may take place in the month of April.

The committee may hold at another time of year one or more extraordinary sessions:

First. By summons of the president of the committee to consider special conditions.

Second. On request made to the president by at least one-third of the members of the committee.

ART. 2. The date of convocation is fixed by the president, who brings it to the knowledge of the delegates three weeks at least before the meeting.

ART. 3. Whenever there is occasion to proceed to the election of the president, this shall take place as a rule in the course of the regular October session.

The vote to this effect shall be by secret ballot, in conformity with article 7 of the organic statutes.

In case the president is prevented from performing his functions, his place shall be taken by the dean of the delegates, according to age.

ART. 4. In case of nomination of a new delegate, his Government shall so inform the president of the committee, at the office in Paris.

This notification is communicated by the president to the other Governments, as well as to the director of the office.

ART. 5. In conformity with article 8 of the statutes, the director shall assist at the meetings of the committee and take part in the deliberations.

At each session the secretary-general of the office shall discharge the duties of secretary of the committee and keep the minutes of the deliberations.

ART. 6. The deliberations of the committee shall be accepted on an absolute majority of the votes of the delegates present, under the conditions provided for by article 6, paragraph 2, of the statutes.

In case of an equal division of votes, the proposition shall be dropped.

No action of the committee can be valid if the number of the States represented is less than half plus 1.

ART. 7. In addressing the calls for a meeting of the committee the president shall communicate to the delegates the programme of subjects for discussion. Every delegate has the right to add to the programme the subjects the discussion of which he wishes to suggest, provided the request is made at a season acceptable to the president. The committee has always the right to discuss at its meetings subjects not included in the programme, provided that two-thirds of the members vote that the said subjects are urgent. In the latter case the decision which results shall not be carried out until after a new examination at the next session.

ART. 8. It belongs to the committee to fix—

(a) The detailed plan for the publications of the office conformably with article 10 of the statutes.

(b) The labor and researches which the office is to undertake.

(c) The general rules for the accountability of the office.

ART. 9. The committee fixes the financial estimate of the office, taking into account articles 12 and 14 of the statutes; it takes cognizance of the financial management, a statement of which is submitted to it in closed meeting by the director, and approves the same after examination, and it receives the report which the director presents on the work of the office during the preceding year and passes on it after examination.

ART. 10. The control conferred upon the committee by article 6 of the statutes is exercised by the committee itself during its sessions. In the interval of the sessions this power is exercised by the president of the committee.

ART. 11. In the course of the sessions a subcommission of three members may be designated for the purpose of examining the accounts of the office in closed meeting and preparing the estimates. The subcommission is elected by secret ballot. The director may be heard by this subcommission.

Other subcommissions may be appointed for specific ends; they are elected by secret ballot.

The president forms part of every subcommission.

ART. 12. The written communications of the committee are signed by the president in the name of the committee.

ART. 13. The expenses of post and telegraph incurred by the president of the committee in the exercise of his office are at the charge of the official estimate.

ART. 14. During the sessions each delegate present receives a compensation of 100 francs per day, not including days not occupied by meetings of the committee or commissions.

In addition, each delegate is allowed travel expenses calculated by zones according to the following division:

First zone: England, Belgium, France, and Switzerland.

Second zone: Spain, Italy.

Third zone: Brazil, United States, Egypt, the Indies, Russia, Servia, Tunis.

Travel expense is calculated on the basis of:

250 francs for the first zone.

500 francs for the second zone.

750 francs for the third zone.

Each delegate may, if the expense of his journey exceeds the proportion indicated above, be reimbursed for his expenses on the basis of his tickets going from and returning to his accustomed residence.

The provisions of the present article apply to the expenses of the president when he repairs to Paris in execution of article 10.

ART. 15. In case the committee should judge it advisable to dispense with the services of a director, this measure should be proposed by at least two members of the committee during the October session, and becomes final only after a delay of six months.

This decision is valid only if it be taken by the absolute majority of the delegates of the states represented in the office.

If the director should resign for any reason, this resignation is effective only after a delay of six months. The committee will, however, have the privilege of abridging this delay.

The same provisions apply as concerns the secretary-general.

REGULATION RELATIVE TO THE FUND FOR RETIREMENT AND AID OF THE PERSONNEL.

ARTICLE 1. There shall be created a fund for retirement and aid of the personnel of the international office of public hygiene.

ART. 2. The retirement fund shall be obtained:

(1) By an annual contribution included in the office estimate and amounting to the sum of 10 per cent of the total of the salaries allotted to the officials and employees of the office.

(2) By a retention of 5 per cent levied on the remuneration of each official or employee.

In case the interest of the capital thus constituted shall not suffice for the payment of the retirements at a given time the necessary surplus for this payment shall be included in the annual estimate of the office.

ART. 3. Every official or employee of the international office of public hygiene who, after ten years' of service, shall become in consequence of disease, infirmity, or debility of his physical or mental functions incapable of continuing to discharge his functions shall receive a pension calculated on the basis of a fourth of his last salary, increased by one-eightieth of the said salary for each year in excess of ten years. In any event, this pension shall not be greater than one-half of the last salary received; it shall in no case exceed 6,000 francs.

Every official or employee numbering ten years' service in the office and having passed his 60th year may request to be retired and to benefit by the provisions previously referred to even if he should not present the incapacities provided for the cessation of duties before the said age is reached.

ART. 4. In case of the death of an official or employee of the office who has had more than ten years of service and who leaves a widow, with or without children, the widow shall receive a pension equal to a third if she has no child; if she has one or two children above 18 years of age, to one-half of that which the deceased would have received or to which he would have been entitled, under article 3, at the time of his death. This pension shall not in any case exceed the sum of 3,000 francs; on the other hand, it shall not be less than 500 francs. If the deceased leaves no widow, but one or more orphan children not having passed their 18th year, there shall be paid into the hands of their guardian an annual allotment which shall, for two orphans or more under the age indicated, equal the third part of the annual pension which would have been accorded to the widow, and for one orphan under 18 years equal to half the said pension. In case the orphans are girls the same allotment shall be made to them until their marriage, or until the age of 21 years if they remain unmarried.

ART. 5. In case an employee not entitled to pension should have his services discontinued, should retire, or die, the committee may allow to the said employee, his widow, or his family, aid not exceeding the amount of one year's salary of the deceased at the time of his discontinuance, dismissal, or death.

REGULATION RELATIVE TO PERSONNEL.

ARTICLE 1. The personnel of the office comprises:

(a) The director and the secretary-general.

(b) A chief of bureau, a subchief of bureau, translating editors, an accountant, a librarian and keeper of the archives, and typists, one of whom shall be a stenographer.

(c) Watchmen and other subaltern agents.

ART. 2. The list of personnel enumerated under (b) and (c) of article 1 shall be fixed according to the necessities of the service within the limits of the estimated resources.

ART. 3. The salary of the director is fixed at 20,000 francs; that of the secretary-general at 12,000 francs. These salaries may be raised, respectively, to 25,000 and 15,000 francs.

(a) The salaries of the other officials of the office are determined as follows:

	Francs.
Bureau chief	6,000 to 8,000
Subbureau chief	5,000 to 7,000
Translating editors	4,000 to 7,000
Accountant	3,000 to 5,000
Librarian and keeper of archives	3,000 to 5,000
Stenographer and typist	2,500 to 3,500
Typist	1,800 to 2,400

(b) The salary of the watchmen of the bureau and other subaltern agents is fixed at 1,500 francs and may be raised to 2,500 francs.

ART. 4. Independently of their salaries, officials and employees are entitled to pensions which are fixed in the provision carrying the creation of a fund for retirement and aid under reservation of the provisions inserted under article 13.

ART. 5. Outside of the fixed list and within the limits of the estimate, persons may be attached provisionally, with the authorization of the committee, for special work in the bureaus of the office.

ART. 6. Every official or employee newly appointed to one of the positions of the office shall receive only the minimum salary provided for that position.

In case of change of duty the official or employee shall not receive a salary inferior to that which he previously received.

ART. 7. At the expiration of each period of three years the officials and employees enumerated under (b) and (c) of article 1 may receive, up to the maximum fixed for the category in which they are placed, an increase of 500 francs for the bureau chief, subbureau chief, translating editors, accountant, and librarian and keeper of archives, and 300 francs for the stenographer and typist, typists, and other employees.

ART. 8. Conformably to the requirements of article 8 of the statutes, the personnel enumerated in paragraphs (b) and (c) are nominated by the director.

ART. 9. The office personnel is selected by direct method after examination by the director into the administrative or scientific titles and qualifications of the candidates for the several employments. The candidates shall have to prove a general acquaintance with the French language. The bureau chief, subbureau chief, and translating editors shall have a knowledge of at least one other living language; the language to be determined for each position by the necessities of the work of the international office.

ART. 10. The age limit for candidates for the positions classed under (b) and (c) of article 1 is fixed at 40 years.

ART. 11. The agents and employees contemplated in the preceding article are not appointed until after a period of six months. The nominations they have received are considered final if at the end of the period they have not been discharged.

ART. 12. Every official and employee is required to devote himself exclusively to the exercise of his duties. The combination of a position in the office and any employment or profession whatever is forbidden.

ART. 13. The measures of discipline applicable to the personnel are as follows:

(1) Reprimand.

(2) Blame, with note to that effect on the register, which may entail a retardation of advancement.

(3) Suspension with cessation of salary for a maximum period of two months.

(4) Revocation. The official loses all right to a retiring pension, but the amount deducted from his salary is restored.

ART. 14. Every official who is under disciplinary measures will first be permitted to furnish explanations and to produce evidence in his defense.

The director shall render account to the committee relative to the disciplinary measures which he may be led to apply.

ART. 15. Every communication not authorized by the director or the secretary-general in regard to the files of the office or information addressed to the office is forbidden under pain of disciplinary measures.

ART. 16. In addition to the public holidays, on which it is possible that the presence of the personnel may be required at the office, the regular annual leaves are determined as follows:

For officials and agents named under (a) and (b) of article 1: Thirty days.
For inferior personnel: Fifteen days.

Officials and agents have the right to take their leave at one time or partially, and at any time of year. The departure on leave is subordinate to the necessities of the office work, and to the authorization of the director.

ART. 17. Absences for sickness are not included in the number of days allowed for regular leave.

ART. 18. Every official who may find himself prevented by sickness from presenting himself at the office should so inform the director, the secretary-general, or his bureau chief. These reports are brought to the knowledge of the director who may, if he judge necessary, delegate a physician to visit the patient.

The absence for sickness shall not be considered justified if such be the advice of the official physician.

ART. 19. In case of sickness the official or employee shall draw his salary entire for a period of two months. At the expiration of this period he may be kept on the rolls for a further period of two months without pay; he shall be considered discharged if he does not resume service after this last period.

REGULATION FOR THE OPERATION OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE.

ARTICLE 1. The director has oversight of all the affairs of the international office; he transacts all business relating to the civil status of the office. He takes all measures for the progress of the service. He signs the bills for expenses and the correspondence relative to the work of the office and which does not by its nature belong to the international committee. Under the control of the international committee and between sessions under that of the president of the committee, he has the deciding of all cases relating to matter treated by the office.

ART. 2. In case of absence the director is replaced by the secretary-general.

ART. 3. The secretary-general is charged with the study of questions which enter into the duties and authority of the office, as well as the preparation of the monthly bulletin. He has the immediate surveillance of the personnel.

ART. 4. The daily work is divided among the personnel by the secretary-general after consultation with the director.

ART. 5. The chief of bureau has under his orders the accountant, the librarian, and the stenographer and typists. He overlooks and combines the work confided to them.

ART. 6. The librarian and keeper of records is specially charged with the registering of the correspondence on the books of entry and departure, of the sealing of letters, the classification and preservation of files, books, reviews, journals, and publications, and their entry in the catalogue of the library.

ART. 7. The director fixes the number of registers of accounts and determines the conditions under which they are kept. He periodically verifies these registers which are to be kept daily. A report is made of these verifications.

ART. 8. The accountant balances the current expenses and for this purpose receives an advance of 500 francs. As far as the regular keeping of the accounts permits, the accountant may be charged with administrative work.

ART. 9. A list is drawn up of the effects of the office, as well as of the books and publications which form part of the library. The furniture and articles are listed as they are acquired or on their arrival at the office, and given a number.

This applies to books independently of their listing on the catalogue referred to in article 6.

ART. 10. The register of this inventory is kept by the accountant.

ART. 11. No expense shall be incurred without written authorization or the visé of the director, and in the case of the absence of the director, of the secretary-general.

ART. 12. The management of the fund for retirement and aid is intrusted to a council composed in the following manner:

The president of the international committee, president.

The director of the office.

The secretary-general.

A delegate designated by the personnel, referred to in (b) and (c) of article 1, and elected for three years.

The funds shall be invested only in government stock of the first order.
Done at Paris, April 8, 1909.

INTERNATIONAL COOPERATION FOR FURTHER PROTECTION AGAINST PLAGUE AND CHOLERA.

The permanent committee of the international office of public hygiene considered during the course of its first session that, in pursuance to article 4 of the by-laws governing the above-mentioned office, it was its duty to consider whether any conditions or facts having a possible bearing on the sanitary defense of the Mediterranean countries in particular demanded special examination on the part of the office with the view to making suggestions to be submitted to the Governments which signed the agreement at Rome December 9, 1907.

As a result, an exchange of views took place at the sixth meeting among the members of the international committee regarding the provision contained in the second paragraph of article 170 of the sanitary convention of Paris and regarding the recently recognized necessity of protecting the Mediterranean littoral in particular, and Europe in general, against the new dangers of an invasion of cholera or plague, owing to the opening up of railroads between Beirut, Kafar, and Medina for the transportation of pilgrims from the East and destined for Hedjas. It was recognized by the committee that the danger of cholera and plague through this route could not have been recognized when the Paris convention was concluded, and that that convention, which had been specially prepared in view of the introduction of these diseases by maritime routes, could offer no effective defense. Resolutions were therefore adopted citing these facts and emphasizing the necessity in the interest of the public health of supplementing existing international sanitary regulations. Following up this action of the committee, its president submitted a copy of the resolution to the Department of State, which communication was forwarded to the Surgeon-General for an expression of his views regarding the matter.

The Surgeon-General in his reply, invited attention to the rapid extension of cholera and plague from their endemic centers and the consequent danger of the introduction of these diseases into the Mediterranean countries and other parts of Europe through railroad communications between Beirut and points east. He further expressed the opinion that the question involved might well be the subject of an international conference for the consideration of further international sanitary regulations to prevent the spread of cholera and plague by the routes mentioned.

DESTRUCTION OF RATS ON VESSELS.

The Surgeon-General also invited attention to investigations made since the adoption of the international sanitary convention of Paris December 3, 1903, which investigations have emphasized the importance of the rat as an agent in the transmission of plague, and the necessity of taking measures for the destruction of rodents on board ships for the prevention of the spread of the disease from one country to another. He therefore expressed the opinion that the systematic

destruction of rodents on ships should also be a subject for the consideration of the next international sanitary convention with the view to the adoption of international sanitary regulations relating thereto.

This matter was the subject of comment in the annual report of this service for 1908, pages 179 and 180. Following this report, correspondence was conducted by the bureau with its officers in China and Japan to learn to what extent disinfection of vessels for the destruction of rats is being done regularly on vessels engaged in trade with the United States, and the substance of the replies received is embodied in a separate chapter in this report, following the chapter on foreign quarantine. With regard to vessels arriving at our ports on the Atlantic and Gulf seaboard, some information has also been received as to occasional disinfection for the destruction of rats at convenient times, as well as the disinfection required by the quarantine regulations. The subject is one that is still under consideration with the various steamship companies.

INTERNATIONAL SANITARY BUREAU OF AMERICAN REPUBLICS IN WASHINGTON.

The service has maintained its interest in the International Sanitary Bureau of American Republics in Washington, and through a resolution passed by each body the said bureau has been brought into relations with the international office of public hygiene in Paris. The Washington bureau is the representative of the international sanitary conventions of the American Republics, three of these conventions having been held, two in Washington, one in Mexico, and the fourth about to be held in Costa Rica, beginning December 25, 1909.

In the "act making appropriations for the diplomatic and consular services," approved March 2, 1909, the following is included:

For the annual share of the United States for the maintenance of the International Sanitary Bureau for the year 1910, \$2,830.79.

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

In 1907 Congress passed the following joint resolution:

[PUBLIC RESOLUTION—No. 16.]

JOINT RESOLUTION Authorizing the President to extend an invitation to the Twelfth International Congress of Hygiene and Demography to hold its thirteenth congress in the city of Washington.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States be, and he is hereby, authorized and requested to extend an invitation to the Twelfth International Congress of Hygiene and Demography, held at Berlin in nineteen hundred and seven, to hold its thirteenth congress in the city of Washington, District of Columbia, anno Domini nineteen hundred and nine, or nineteen hundred and ten.

Approved, February 26, 1907.

Referring to the above joint resolution, the following item appears in the "Act making appropriations for the diplomatic and consular service," approved March 2, 1909:

To enable the Government of the United States suitably to participate in the Twelfth International Congress of Hygiene and Demography, which will be held at the city of Washington, D. C., in 1910, in pursuance of the invitation extended by the President of the United States, in virtue of the joint resolution

of the Congress thereof, approved February 26, 1907, and to meet the expenses that will actually and necessarily be incurred by the United States by reason of such invitation and meeting, ten thousand dollars, or so much thereof as may be required.

An account of the organization and preparations made for this congress will appear in the next annual report.

THE SANITATION OF GUAYAQUIL, ECUADOR.

In the annual report for 1908, page 141, reference is made to the quarantine and sanitation in Guayaquil, Ecuador, and to the fact that on March 27, 1908, Passed Asst. Surg. B. J. Lloyd was appointed by the President of that Republic as a member of a special technical commission to devise and enforce sanitary regulations for the suppression of plague in Guayaquil.

In February, 1908, Doctor Lloyd had discovered the existence of bubonic plague in Guayaquil. The fact of this discovery and its announcement caused much indignation at the time, but plague spread so rapidly that the people later became greatly alarmed, and at the instance of the President of Ecuador, Doctor Lloyd was appointed president and director of the special sanitary commission which was charged with the duty of combating plague, yellow fever, and smallpox, which position he accepted with the consent of the Secretary of the Treasury and the approval of the Department of State.

Doctor Lloyd continued his duties as director of health on the above-mentioned commission until September 11, 1909, when he resigned, and in a communication of September 8 from the consul-general at Guayaquil, it was stated that the Ecuadorian Government had appointed Dr. Luis F. Cornejo G., formerly a temporary acting assistant surgeon in the Public Health and Marine-Hospital Service, to succeed Doctor Lloyd as director of health.

Failure to provide necessary funds and to enforce the regulations of the board of health are the causes which led to the resignation of Doctor Lloyd. Public sentiment supports operations against plague, but is indifferent with regard to yellow fever. Another officer, Passed Asst. Surg. H. B. Parker, has been detailed to succeed Doctor Lloyd in the office of the United States consul to inspect vessels leaving for ports in the United States.

During the period that Doctor Lloyd was director of health, smallpox was eradicated and the number of plague cases rapidly diminished until the disease seemingly disappeared, though he warned the people at the time that the work against plague had virtually hardly begun. The work against yellow fever was also pushed vigorously until funds failed, and as soon as the effects of antimosquito work became apparent, there was a drop of 20 per cent in the mortality of this disease over previous years.

The consul-general, in his communication, states that the net results of Doctor Lloyd's work as director of health may be summarized as follows:

1. He has established a public health service with definite laws and regulations.

2. Under his administration cases of smallpox were systematically isolated and contacts vaccinated—the first instance of the kind in the

history of Ecuador. Incidentally, there has not been a death from smallpox in Guayaquil for nearly eleven months. Formerly the disease was endemic, the mortality ranging from 200 to 500 deaths annually.

3. He seems to have demonstrated that even partially successful mosquito work will produce a marked diminution of the death rate.

4. He leaves behind him clearly mapped out the necessary steps to be taken to eradicate yellow fever.

5. He demonstrated that an effective sanitary corps can be trained on the ground.

6. He has also demonstrated that vital statistics under former conditions had no practical value, except to determine the actual number of deaths.

7. He has successfully combated plague in the smaller towns where measures may be carried out by force when necessary.

For details connected with the work of Doctor Lloyd in Guayaquil, both with regard to quarantine and to sanitation, attention is invited to extracts from his report in the chapter on "Foreign quarantine."

Guayaquil is the worst infected port on the Western Hemisphere. For many years it has been recognized as one of the chief foci of yellow fever. It has also become infected with plague, and its sanitary condition has been such as to make it a menace to other ports, and especially to Panama and the Canal Zone.

During the year the bureau was visited by representatives of the Ecuadorean Government, and plans for sewerage and for furnishing a good water supply for the city of Guayaquil were exhibited. It was understood that an effort would be made to have these plans executed. So far, however, no information has reached the bureau that an attempt of this kind has been made.

The insanitary condition of Guayaquil is a subject for serious consideration by all the American Republics with whose ports it has commercial relations.

INVESTIGATION OF MILD EPIDEMIC JAUNDICE IN TEXAS.

The president of the Texas state board of health, Dr. William M. Brumby, in a letter dated June 20, 1909, reported to the bureau the existence of an epidemic of mild jaundice in the different parts of Texas.

Surg. G. M. Guiteras, of the service, was directed on July 2, 1909, to proceed to Austin, Tex., confer with the state health authorities, and then visit the localities wherein the disease in question was reported, and make an investigation and report of conditions.

At Corpus Christi, the first town visited, it was learned that the first case of "jaundice" appeared in September, 1908, and the last case in February, 1909. Between these dates 150 cases of the disease were observed. During the months of September, October, and December of 1908, the period during which the epidemic prevailed, there was no notable increase in the infant death rate as compared with the spring and summer months of the same year.

The next town visited was Alice, with a population of about 1,500. Here between October of 1908 and January of 1909, 50 cases of "jaundice" had been reported.

From two physicians opinions were given that there was a marked connection between the "jaundice" and an influenza epidemic which was prevalent at the time. A slow pulse had not been observed in this disease.

A visit was then made to the town of Falfurrias, which is 70 miles south of Alice, and which has a population of about 2,500. In this town between July 11, 1908, and April 20, 1909, between 75 and 100 cases of "jaundice" were treated.

Skidmore, a town of about 900 inhabitants, and San Antonio were also visited, but no cases of the disease had been reported.

Doctor Guiteras was of the opinion that from the description of the disease prevalent in southern Texas in the fall, winter, and early spring of 1908 and 1909, it was possible to exclude both yellow fever and Weil's disease for the following reasons: First, the gradual onset and mildness of the disease in connection with an intense jaundice lasting for several weeks. Second, the absence of albuminuria and marked gastric disturbance.

In view of the number of cases observed in Corpus Christi, Alice, and Falfurrias, and the fact that no precautions were taken, had the disease been yellow fever it would be quite impossible to understand why the epidemic disappeared just at the coming of warm weather, instead of increasing or even assuming alarming proportions, which under the circumstances would have been expected.

Doctor Guiteras was inclined to believe that the disease under consideration was an epidemic jaundice due to an hepatic choli-bacillary infection, probably aided by unknown climatic and telluric influences.

DOMESTIC QUARANTINE.

REPORTS FROM THE NATIONAL QUARANTINE STATIONS.

During the fiscal year ending June 30, 1909, at the various stations of the United States, a total of 8,266 vessels were inspected, and 520 were disinfected, either for the destruction of mosquitoes as a precaution against the introduction of yellow fever, or for the destruction of rats and other vermin as a precaution against plague. In addition 495 vessels were spoken and passed, making a grand total of 8,761 vessels passing under the observation of the service at the ports in the continental United States.

Following are the summaries of the operations at the various quarantine stations:

Eastport, Me., quarantine.—Acting Asst. Surg. E. M. Small in charge.

Eight hundred and sixty-nine steamers and 85 sailing vessels were inspected. These vessels carried a total of 33,847 passengers and 23,499 crew.

Portland, Me., quarantine.—Surg. J. M. Eager in command.

One hundred and thirty-seven steamers and 28 sailing vessels were inspected and passed. These vessels carried 6,420 crew and 2,784 passengers.

Perth Amboy, N. J., quarantine.—Acting Asst. Surg. Charles W. Naulty, jr., in charge.

Twelve steamers were spoken and passed; 46 steamers and 4 sailing vessels were inspected and passed and 4 steamers were fumigated. There were 39 crew on sailing vessels and 1,191 crew on steamers. On the steamers were 6 stowaways.

Reedy Island quarantine.—Post-office address, Port Penn, Del.; telegraphic address, Reedy Island, Del. Passed Asst. Surg. W. A. Korn in command.

One thousand one hundred and three vessels were inspected and passed, of which 991 were steamers and 112 were sailing vessels. Eleven vessels were spoken and passed, and 3 were fumigated. Upon the steamers 37,537 crew and 12,833 passengers were inspected. Upon the sailing vessels 1,250 crew were inspected. Temperatures were taken of the crews of 75 vessels coming from ports suspected of yellow-fever infection, and glandular examinations were made of the crews of 20 vessels from ports where plague prevailed.

August 9, 1908, steamship *Haverford*, from Liverpool for Philadelphia, arrived with 1 case of smallpox. Case removed to island, and living quarters and dunnage disinfected.

Delaware Breakwater quarantine.—Post-office and telegraphic address, Lewes, Del., Asst. Surg. Edward R. Marshall in command.

Eighty steamers and 31 sailing vessels were inspected and passed. The steamers and sailing vessels carried 3,479 crew and 27 passengers.

Alexandria, Va., quarantine.—Acting Asst. Surg. Arthur Snowden in charge.

One steamer and 7 sailing vessels were inspected and passed, with a total of 75 crew.

Cape Charles quarantine.—Post-office and telegraphic address, Fort Monroe, Va. Passed Asst. Surg. G. L. Collins in command.

Nine vessels were spoken and passed, 351 steamers were inspected, and 11 steamers were disinfected; 21 sailing vessels were inspected and 1 disinfected. On these vessels there were 29,863 crew and 6,439 passengers, making a total of 36,301 persons inspected.

Washington, N. C., quarantine.—Acting Asst. Surg. J. C. Rodman in charge.

There were no transactions during the fiscal year.

Cape Fear quarantine.—Post-office and telegraphic address, Southport, N. C., Surg. E. K. Sprague in command.

Thirty-four vessels (26 steamers and 8 sailing vessels) were inspected and passed, and 3 steamers were disinfected. These vessels carried a total of 788 crew and 6 passengers. The vessels disinfected were from ports of Mexico and Brazil.

Georgetown, S. C., quarantine.—Acting Asst. Surg. J. William Folk in charge.

Four vessels, with a total of 31 crew, were inspected and passed.

Charleston, S. C., quarantine.—Passed Asst. Surg. Baylis H. Earle in command.

Eight sailing vessels and 107 steamers were inspected and passed and 1 steamer was disinfected. These vessels carried a total of 3,185 crew and 197 passengers, among the latter being 2 stowaways.

Beaufort, S. C., quarantine.—Acting Asst. Surg. Christopher G. Hay in charge.

One vessel was spoken and passed and 3 steamers and 2 sailing vessels were inspected and passed. Upon the above vessels there was a total of 92 crew.

Port Royal, S. C., quarantine.—Acting Asst. Surg. William P. Gibbes in charge.

There were no transactions during the fiscal year.

Savannah, Ga., quarantine.—Asst. Surg. Hugh de Valin in command.

Three vessels were boarded and passed, 118 were inspected and passed, and 7 were spoken and passed. Two vessels were fumigated and held to complete five days from port of departure. These vessels carried a total of 3,161 crew and 15 passengers.

South Atlantic quarantine.—Post-office address, Inverness, Ga. Telegraphic address, Darien, Ga. Asst. Surg. W. M. Bryan in command.

Six steamers and 3 sailing vessels were inspected and passed. These vessels carried a total of 171 crew.

Brunswick, Ga., quarantine.—Passed Asst. Surg. R. D. Spratt in command.

Forty-two vessels were spoken and passed, 23 steamers and 59 sailing vessels were inspected and passed, and 6 sailing vessels were disinfected. These vessels carried a total of 1,140 crew and 53 passengers.

Tampa Bay, Fla., quarantine.—Post-office address, Fort De Soto, Fla. Telegraphic address, via Palmetto, Fla. Passed Asst. Surg. H. McG. Robertson in command.

Seven vessels were spoken and passed, 90 steamers and 102 sailing vessels were inspected and passed, and 37 steamers and 16 sailing vessels were disinfected. These vessels carried a total of 560 passengers and 4,532 crew. There were no cases of quarantinable disease, but 3 cases of illness on board vessels were held under observation.

Cedar Keys, Fla., quarantine.—Acting Asst. Surg. R. T. Walker in charge.

There were no transactions during the fiscal year.

Cumberland Sound quarantine.—Post-office and telegraphic address, Fernandina, Fla. Acting Asst. Surg. J. Louis Horsey in charge.

Fifty-nine vessels were spoken and passed, 70 steamers were inspected and passed, and 1 steamer was disinfected; 26 sailing vessels were inspected and passed, and 4 sailing vessels were disinfected. Four vessels were fumigated to kill mosquitoes, and 1 was fumigated to kill rats. On these vessels there were 2,958 crew and 31 passengers.

St. Johns River quarantine.—Post-office and telegraphic address, Mayport, Fla. Acting Asst. Surg. F. J. McKinley in charge.

Seventy-six vessels were inspected and passed and 1 vessel was fumigated. On these vessels there were 48 passengers and a total of 898 crew.

Biscayne Bay quarantine.—Post-office and telegraphic address, Miami, Fla. Acting Asst. Surg. James M. Jackson, jr., in charge.

One hundred and ninety-two vessels were spoken and passed; 35 steamers and 59 sailing vessels were inspected and passed. These vessels carried a total of 2,404 crew and 3,089 passengers.

Key West, Fla., quarantine.—Acting Asst. Surg. S. D. W. Light in charge.

During the year 253 steamers, carrying a total crew of 11,759 and 12,423 passengers, and 78 sailing vessels, carrying a total crew of 606 and 264 passengers, were inspected and passed. Eight sailing vessels were disinfected and held for observation.

Knights Key, Fla., quarantine.—Acting Asst. Surg. Joseph Y. Porter, jr., reports 182 vessels inspected, on which there were 2,951 passengers.

Bocagrande quarantine.—Post-office and telegraphic address, South Bocagrande, Fla. Acting Asst. Surg. W. Barnes in charge.

During the year 25 vessels were spoken and passed, and 3 vessels were inspected and passed.

Pensacola, Fla., quarantine.—Acting Asst. Surg. R. C. White in charge.

During the year 48 vessels were boarded and passed, 33 vessels were spoken and passed, 145 steamers were inspected and passed, and 12 steamers were disinfected; 71 sailing vessels were inspected and passed and 10 sailing vessels were disinfected. On these vessels there were 8,102 crew and 37 passengers, and while no cases of quarantinable disease occurred, 6 cases of malarial fever, remittent, were removed to the hospital at the station for observation and treatment.

St. George Sound quarantine.—Post-office and telegraphic address, Carrabelle, Fla. Acting Asst. Surg. B. B. Blount in charge.

Thirty-six vessels, carrying a total of 387 crew, were inspected and passed, 3 vessels were fumigated to kill vermin, and 1 vessel was remanded to Ship Island quarantine station for fumigation and disinfection.

Mobile, Ala., quarantine.—Passed Asst. Surg. Edward Francis in command.

A total of 675 vessels were inspected and passed, of which 472 were steamers and 203 were sailing vessels; 41 vessels were detained in quarantine and 45 were disinfected. On these vessels were 12,698 crew and 476 passengers. Eighteen cases of malarial fever were removed from vessels for observation and treatment, but no cases of quarantinable disease occurred.

Pascagoula, Miss., quarantine.—Acting Asst. Surg. B. F. Duke in charge.

Thirteen vessels were spoken and passed, 34 steamers and 77 sailing vessels were inspected and passed, and 28 sailing vessels were disinfected. These vessels carried a total of 2,151 crew and 32 passengers.

Gulf quarantine station.—Post-office and telegraphic address, Biloxi, Miss. Passed Asst. Surg. John T. Burkhalter in command.

The station is located on Ship Island, about 12 miles off the Mississippi shore, and separated from the mainland by the Mississippi Sound. The quarantine station proper, with its anchorage for infected and possibly infected vessels, is located on the north shore of the island, at about its mid point. The inspection station is at the west end of the island, about 4 miles distant from the station proper. This latter station is maintained for the inspection of presumably noninfected vessels only.

The station is available for such ports in Mississippi as Gulfport, Pascagoula, Scranton, and Moss Point; also for infected vessels which may be remanded from other Gulf stations.

A pier about one-half mile long, extending from the shore in front of the executive building, constitutes the main approach to the station. A boathouse and ways, for the accommodation of the station vessels, is located near the end of this pier.

The new executive building, assistant's and pharmacist's quarters, and attendants' quarters are nearing completion. The two former are built on concrete piers and the latter on piling. These buildings should be able to weather the hurricanes which prevail during the months of August and September. Besides the commanding officer's quarters, the station has a yellow-fever hospital, a noncontagious hospital, and several small buildings.

For disinfecting vessels the station is equipped with pots and tubs, a disinfecting barge containing a bichloride pump, steam chambers, and sulphur furnace and fan. Disinfection with formaldehyde gas is done by the permanganate of potash and formalin method. The west end inspection station consists of a four-room house for quarters, placed on piling. This station is operated during the "close season" only.

The transactions were as follows: Vessels boarded and passed—steamers 20, sailing vessels 5; vessels inspected and passed—steamers 57, sailing vessels 66; vessels fumigated and passed—steamers 7, sailing vessels 21; vessels fumigated and held—steamers 3, sailing vessels 19. The above vessels carried a total of 3,121 crew and 26 passengers.

Nine cases of malarial fever were detected among the crew and the necessary medical attention given aboard ship.

New Orleans quarantine.—Post-office address, Quarantine, La.; telegraphic address, via New Orleans, La. Passed Asst. Surg. R. H. von Ezdorf in command.

TRANSACTIONS AT THE NEW ORLEANS QUARANTINE STATION.

	Steam-ships.	Sailing vessels.	Total.
Inspected and passed.....	700	2	702
Inspected and detained for fumigation.....	136	6	142
Inspected and held for 5 days.....	8	5	13
Inspected and held to complete a period of 5 days from date of fumigation at a foreign port.....	51	0	51
Inspected and held on account of smallpox infection.....	3	0	3
Inspected and held for completion of diagnosis of cases of sickness found on arrival.....	18	0	18
Inspected and passed from domestic ports.....	55	0	55
Spoken and passed.....	31	2	33
Boarded and passed.....	1	0	1
Vessels fumigated and disinfected.....	195	11	206
Total number of vessels inspected.....	971	13	984
Number of crew inspected.....	33,671	179	33,850
Number of passengers inspected.....	7,640	0	7,640
Total number persons removed from vessels held in detention.....			98

TRANSACTIONS AT LOWER INSPECTION STATION AT PORT EADS, NEAR THE MOUTH OF THE MISSISSIPPI RIVER.

	Steam-ships.	Sailing vessels.	Total.
Number of vessels from foreign ports inspected and passed.....	135	11	196
Number of crew on vessels from foreign ports.....	7,714	181	7,895
Number of passengers on vessels from foreign ports.....	1,058	0	1,058
Number of vessels from domestic ports inspected and passed.....	61	0	61
Number of crew on vessels from domestic ports.....	1,960	0	1,960
Number of passengers on vessels from domestic ports.....	5	0	5

A total of 1,241 vessels were inspected at the port of New Orleans and at the substation at Port Eads.

No quarantinable diseases were observed at the station during the fiscal year.

On account of a rise in temperature a number of persons (chiefly crew) were removed from vessels to the quarantine hospital for observation. The following is a list of diseases treated in the hospital at the quarantine station during the fiscal year ended June 30, 1909:

Malaria.....	39
Typhoid.....	9
Tuberculosis.....	6
Pleurisy.....	2
Influenza.....	1
General diseases.....	51
Temporary elevations of temperature otherwise in good health.....	3
Total.....	111

The following is a partial list of cases found at the time of the inspection of vessels, which cases were diagnosed and the vessels then allowed to proceed to New Orleans:

Typhoid fever.....	6
Malaria, confirmed microscopically.....	19
Tuberculosis, confirmed microscopically.....	6

Pneumonia -----	3
Dysentery -----	1
Impetigo contagiosa -----	1
General diseases -----	35
Total -----	71

Beginning September 28, 1908, when yellow fever was reported in Ceiba, Honduras, to October 5, 1908, when quarantine restrictions against that port were removed by order of the bureau, fruit vessels from Ceiba were fumigated, and the crew, except the master, first mate, and chief engineer, detained in quarantine. The vessels were then released and new crews were placed aboard them to New Orleans.

On October 7, 1908, the Brazilian steamship *Amazonas* arrived from Rio de Janeiro via Pernambuco and Barbados. A case of smallpox, in the person of the second engineer of this vessel, was landed at Pernambuco. The vessel was disinfected at Barbados under the supervision of a service representative, and after being again thoroughly disinfected at the New Orleans quarantine station, and the crew vaccinated, was discharged in free pratique October 9, 1908.

On October 13, 1908, the Italian steamship *Liguria* arrived from Genoa. Four cases of varicella and one case of measles were reported as having occurred among the immigrant passengers and found to be convalescing. The local health authorities at New Orleans were informed of this, as is required under the United States Quarantine Regulations, paragraph 67.

On November 4, 1908, the British steamship *Castillian Prince* arrived from Rio de Janeiro via Victoria and Bridgetown, Barbados. At Bridgetown a case of smallpox was removed from the vessel. The vessel was disinfected and detained four days to complete fourteen days from the date of disinfection, which was performed by the service representative at Bridgetown.

On December 30, 1908, the French steamship *Gloride* arrived from Habana, where previous to departure a case of smallpox was removed from among some immigrant passengers. The vessel was disinfected at Habana before departure under the supervision of the service officer stationed there. There were six immigrant passengers on board destined for New Orleans, all of whom had been exposed to infection. These passengers were detained at quarantine and the vessel released, subject to the observation of the sanitary inspection service at New Orleans under Surg. J. H. White.

On March 1, 1909, the American steamship *Momus* from New York arrived at the station with a case of scarlet fever. The local health authorities at New Orleans were notified of the fact.

On June 18, 1909, when the steamship *Imperator* arrived at the station, the master of the vessel was advised to have all living quarters disinfected, watertank washed out and steamed, and all dishes, glasses, tableware, etc., boiled, as four cases of typhoid fever had been traced to this vessel. Three of these cases had been removed on the previous voyage to the quarantine hospital, where the diagnosis was made after observation. The fourth case was discovered on another vessel in one of the crew who had joined that vessel after being discharged from the steamship *Imperator*. The work of disinfection was done at the New Orleans station.

In the instances where a case of tuberculosis was discovered among the crew of vessels, advice was given as to the sanitary and hygienic measures to be followed to avoid the spread of the infection.

TRANSACTIONS DURING CLOSE QUARANTINE SEASON.

All vessels entering the river by South Pass between the hours of sunrise and sunset are boarded by the medical officer stationed at Port Eads. He is instructed to issue pratique to vessels coming direct from clean European ports and Porto Rico with good sanitary history, after satisfying himself that all persons are well.

All vessels from tropical ports, or such as have any sickness aboard, are remanded by him to the New Orleans quarantine station for inspection and treatment, when required.

Vessels arriving between sunset and sunrise proceed to the upper quarantine station for inspection.

The result of the inspection of vessels remanded is telephoned by the officer at the substation to the main station, in order that there may be no more delay than that necessary to a thorough inspection, and that preparations may be made to disinfect such vessels as require it.

The principal shipping passing through to the port of New Orleans is from tropical ports. The inspection of these vessels, made at the station, consists in the examination of papers, a visual inspection and the taking of the temperature of each and every individual on the vessel. During close quarantine season all records of temperatures taken are kept on file in the office.

Where the temperature of an individual is found to register 37.8° C. or over, and the cause for such a rise in temperature is not apparent, the individual is immediately removed to the quarantine hospital for observation and treatment.

TRANSACTIONS DURING OPEN QUARANTINE SEASON.

All vessels except those from plague ports entering the river by South Pass between the hours of sunrise and sunset are inspected by the medical officer stationed at Port Eads, and pratique issued, provided all are found well after a careful visual inspection. All vessels arriving at night, and vessels from plague ports or with sickness aboard, proceed to this upper quarantine station for inspection.

The inspection of fruit vessels at night is the same as is done during the close quarantine season, namely, a careful visual inspection and the recording of the temperature of each and every person.

During the entire year the inspection of vessels from plague ports consists in a careful examination of papers and the history of the vessel, the recording of the temperatures, and a glandular examination of all persons. These vessels are also fumigated with sulphur dioxide for the purpose of killing rats, and all bedding and soiled clothing on board is steamed.

NIGHT INSPECTIONS.

Under the state régime all fruit vessels arriving at any hour of the night were inspected, for which the medical officers and employees received extra compensation. The practice of making night inspec-

tions at any hour has been continued, but on May 26, 1907, was limited to 12 o'clock midnight. No fee nor extra compensation has been allowed for such night-inspection work since this station has been operated by the service.

During close quarantine season it has been the practice of the medical officer in command to personally make the examination of all vessels and persons coming from tropical or suspicious ports. The commanding officer and his assistant are on duty between the hours of sunrise and midnight, approximately nineteen to twenty hours of the day.

All persons who have been removed from vessels to the quarantine hospital are carefully studied and observed, and a clinical record kept under the personal supervision of the commanding officer.

Since the operation of the station under federal supervision no quarantinable disease has been observed.

San Diego, Cal., quarantine.—Acting Asst. Surg. W. W. McKay in charge.

Forty-four vessels were spoken and passed, 172 steamers and 16 sailing vessels were inspected and passed, and 1 sailing vessel was fumigated. These vessels carried crews aggregating 3,596, and passengers aggregating 1,412.

The 44 vessels spoken and passed were either navy vessels from Magdalena Bay, Mexico, where they had gone for target practice, or coastwise (California coast) vessels that had been spoken for their certificate of fumigation from San Francisco.

San Francisco quarantine.—Post-office and telegraphic address, Angel Island, Cal. Passed Asst. Surg. F. E. Trotter in command.

Seven vessels were spoken and passed, and 108 vessels were boarded and passed; 362 steamers were inspected and passed, and 10 steamers were disinfected; 208 sailing vessels were inspected and passed, and 2 were disinfected. These vessels carried a total of 53,996 crew and 40,662 passengers. Of these vessels 197 were from plague and cholera-infected ports, and 63 were from yellow fever ports.

Under the heading "Boarded and passed," the steamers have been listed under two heads, viz, "Merchant" and "Government." The first are the Pacific Coast Steamship Company's vessels from Victoria, British Columbia, which are provided with special certificates from the service representative at Port Townsend, Wash., and the second are, for the most part, United States naval vessels returning to San Francisco from target practice at Magdalena Bay, Mexico.

Occasional requests are received from shipowners for the fumigation of their vessels, and these requests have always been met, the service furnishing a representative to direct the work.

The most noteworthy incident of the year has been the discontinuance of the fumigation of vessels departing from San Francisco. The transactions of the service at this station, operated as "Plague-suppressive measures," between June 30 and October 21, 1908, were as follows:

Vessels fumigated and certified.....	483
Vessels certified.....	1, 011

The work terminated October 21, 1908, and the barge *Disinfector*, with the property used, was brought to the station.

Port Townsend, Wash., quarantine and subports.—Surg. J. H. Oakley in command.

During the fiscal year ending June 30, 1909, 398 vessels were boarded; of these, 254 were steamers, and the remaining 144 sailing vessels. Of the total number of vessels boarded 394 were inspected and passed, and 41 steamers were detained for disinfection in whole or in part, as the circumstances demanded. The 398 vessels carried a total of 20,597 passengers, and their crews numbered 20,765.

Shortly after the close of the fiscal year the new boarding boat for this station was delivered. The vessel is 72 feet over all in length and 14 feet in beam. The motive power is derived from a starboard and port engine of 65 horsepower. The vessel was named after the late Passed Asst. Surg. W. M. Wightman.

At the subport of Port Angeles, Wash., 2 steamers and 6 sailing vessels, carrying 152 men in their crews, were inspected and passed during the year.

At the subport of South Bend, Wash., 37 steamers and 2 sailing vessels were inspected and passed. These vessels carried 29 passengers, and their crews were made up of 781 persons.

Columbia River, Oreg., quarantine and subports.—Post-office and telegraphic address, Astoria, Oreg. Passed Asst. Surg. J. M. Holt in command.

During the year 117 steamers and 68 sailing vessels were inspected and passed. These vessels carried 6,023 crew and 4,354 passengers.

Coos Bay quarantine (substation).—Post-office and telegraphic address, North Bend, Oreg.

Fifty-six steamers and 8 sailing vessels, with 58 crew and 29 passengers, were inspected and passed.

Siuslaw and Umpqua River quarantine (subport).—Three steamers and 6 sailing vessels, with 75 crew, were inspected and passed during the year.

Yaquina Bay quarantine (substation).—No transactions during the year.

Grays Harbor quarantine (substation).—One hundred and twenty-seven steamers and 44 sailing vessels, with 876 passengers and 3,141 crew, were inspected and passed during the year. Nine vessels were fumigated during this period.

TEXAS-MEXICAN BORDER INSPECTION.

El Paso, Tex.—Acting Asst. Surg. E. Alexander reports that during the year 15,113 passengers were inspected. There were 168 vaccinations and 17 fumigations of hides and bones; 49 nonimmunes from Tampico and Veracruz were held under observation to complete the period of five days from port of departure.

Laredo, Tex.—Acting Asst. Surg. H. J. Hamilton reports that during the year 743 passenger trains, carrying 49,601 passengers, were inspected, 12,433 aliens were inspected and 614 persons were vaccinated. The death and embalming certificates, together with containers for 6 cadavers, were inspected, and 5 aliens and 6 citizens were detained to complete the period of five days from port of departure. One case of smallpox was discovered and returned to Mexico.

Eagle Pass, Tex.—Acting Asst. Surg. Lea Hume reports that during the year the transactions were as follows:

Total number of trains inspected.....	370
Total number of persons inspected on trains.....	14, 298
Total number of persons inspected on bridge.....	2, 000

But slight difficulty was found in keeping out contagious diseases at Eagle Pass, because of the cooperation of the Mexican health authorities. When any contagious disease manifests itself on the Mexican side of the Rio Grande, the medical officer of the service is informed at once, and he immediately takes steps to prevent the spread of the disease by advising and assisting in the necessary quarantine work.

During the fiscal year just ended there were in all 5 sporadic smallpox cases in the city of Porfirio Diaz, Mexico (just across the Rio Grande from Eagle Pass, Tex.). Owing to efficient quarantine, vaccination, etc., there was no spread of the contagion.

Along the line of the Mexican International Railroad, from the city of Porfirio Diaz to Torreon, Mexico, there was an epidemic of smallpox during the months of February and March. The federal quarantine officer at Eagle Pass encouraged the Mexican International Railroad officials in their work of free compulsory vaccination and the isolating and quarantining of actual cases. Thorough disinfection was accomplished in all cases, and furniture, clothing, and old huts in which the smallpox cases were confined, were burned immediately after recovery from the disease. It was due to these precautions that no epidemic occurred on the American side of the river.

It is the custom of the service officer to inspect all trains from Mexico on the railroad bridge over the Rio Grande. This is accomplished by his going every day to the city of Porfirio Diaz, Mexico, where the Southern Pacific and Mexican International trains meet. Passengers are there transferred from the Mexican train to the Southern Pacific. When the Southern Pacific train is ready to leave for Texas, the service officer boards it and proceeds with it on the bridge, and the train is stopped at a midpoint on the border line between the United States and Mexico. Here the actual inspection work is done. The quarantine officer inspects each person on the train and administers an oath to the effect that the passenger has not been in any infected district nor has been exposed to any contagious disease. In the event of a suspicious case, the train is ordered back to Mexico, where the conductor of the train is requested to remove the suspect and leave him on Mexican soil. This is necessary because the service maintains no quarantine camp in Eagle Pass, hence the Mexican officials must take charge of the suspect. This procedure is carried out with all persons, American citizens included. With the Texas authorities the custom is the same. In the event that actual disease is discovered in a coach, it is refused entrance until it has been thoroughly fumigated.

SUPPLEMENTAL INSPECTION SERVICE AT NEW ORLEANS, LA.

Pursuing the plan described in the annual report of 1908 of maintaining a sufficient surveillance over persons arriving at New Orleans from the tropical ports which, while considered suspicious, were not known to be infected with yellow fever, the bureau continued this

service at New Orleans, its usefulness being increased by the cooperation of the state health authorities of Texas and Louisiana.

The fiscal year just closed shows 38,126 persons under surveillance, as against 36,213 last year, and in the local work in New Orleans 4,682 persons, as against 4,571 last year, these latter being crew and passengers remaining in infectible territory to be watched until the expiration of the period of incubation.

Besides this, 30,660 members of regular crews were under observation while in port, as against 29,561 last year.

The greater amount of security given by this work is in some measure responsible for a marked improvement in the class of vessels now in the tropical trade, no less than 6 large new steamers of modern type, 6,000 tons register, having replaced about 12 of the old second-rate chartered class. These large vessels carry practically all the passenger traffic, and every vessel carries a ship surgeon, who is employed or discharged under the direction of either Surg. J. H. White, at New Orleans proper, or Passed Asst. Surg. R. H. von Ezdorf, at the quarantine station.

TRANSACTIONS AT THE NEW ORLEANS SANITARY INSPECTION OFFICE, YEAR ENDING JUNE 30, 1909.

Month.	Number of vessels.	Number of crew.	Number of passengers.	Number of crew discharged.	Number of passengers to New Orleans via other ports.	Total number of persons inspected on arrival.	Total number of passengers at New Orleans giving destination in infectible territory.	Total number of passengers at New Orleans giving destination in noninfectible territory.	Total number of persons kept under surveillance.	Total number of passengers kept under surveillance.	Number of passengers destined for noninfectible points finally passed at New Orleans.	Number of cases of illness reported aboard vessels.	Total number of persons not seen for final inspection.
1908.													
July.....	63	2,027	444	39	11	2,482	229	215	2,358	342	102	14	0
August.....	70	2,214	579	65	8	2,801	278	301	2,566	360	74	16	1
September....	61	2,379	643	61	13	3,035	412	231	2,863	497	72	17	2
October.....	77	2,582	469	72	12	3,063	278	191	2,899	329	39	15	0
November.....	73	2,761	563	64	4	3,328	363	200	3,138	381	14	5	8
December....	78	2,783	578	41	2	3,363	292	286	3,082	301	7	11	0
1909.													
January.....	64	2,152	611	48	0	2,763	299	312	2,485	333	34	10	2
February.....	57	1,885	472	46	1	2,358	228	244	2,133	249	20	3	3
March.....	84	3,168	823	93	14	4,005	361	462	3,562	408	33	8	3
April.....	77	2,396	729	82	15	3,140	327	402	2,871	490	148	24	1
May.....	92	3,793	964	129	8	4,692	425	539	4,380	595	162	21	1
June.....	74	2,520	570	78	6	3,096	278	292	2,808	294	10	12	2
Total...	870	30,660	7,445	818	94	38,126	3,770	3,675	35,145	4,579	715	156	23

SUPPLEMENTAL INSPECTION SERVICE AT MOBILE, ALA.

This inspection service, similar to the one maintained at New Orleans, is conducted by Acting Asst. Surg. Henry Goldthwaite. All the personnel of vessels arriving at Mobile from the Tropics are held under observation after having passed the regular inspection at the quarantine station. The transactions for the fiscal year ending June 30, 1909, are as follows:

Number of vessels inspected.....	675
Number of crew inspected.....	12,698
Number of passengers inspected.....	476

Passengers from tropical ports certified to Surgeon White, New Orleans, for observation -----	35
Passengers from tropical ports certified from Surgeon White, New Orleans, for observation at Mobile-----	76

No case of quarantinable disease was found on any vessel during the year.

NEW QUARANTINE STATIONS.

THE NEW ORLEANS QUARANTINE STATION.

As mentioned in previous annual reports of the service, the New Orleans quarantine station and its substation Port Eads, and the stations at Rigolettes, Atchafalaya, Lake Charles and Lake Borne, formerly operated by the State of Louisiana, passed into the charge of the Public Health and Marine-Hospital Service on April 1, 1907, and have been operated by it continuously since that time. Owing to the failure on the part of the State of Louisiana to render a clear title to certain of the lands required in connection with the station, much litigation has been necessary.

In the near future, however, all irregularities in the title will be removed and the final improvement and equipment of the station will be effected.

This station, formerly operating under the Louisiana state board of health, was called the Mississippi River quarantine station, and upon its transfer to the United States on April 1, 1907, was named the New Orleans quarantine station, under the order of the Surgeon-General, Public Health and Marine-Hospital Service, dated March 25, 1907.

The New Orleans quarantine station is located on the left bank of the Mississippi River about 90 miles below the city of New Orleans. An inspection station, considered a part of the main station, is maintained at Port Eads, which is 15 miles below at the mouth of the South Pass of the river.

The quarantine reservation includes a strip of land about 2,000 acres in extent, having 50 acres frontage on the Mississippi River and a depth of about 40 acres. The boundary lines are not clearly marked, except where this land is bounded by the river and other water courses. There is a short fence built at the upper end of the reservation where the land borders on private property. With the exception of about 10 acres on which the station is located, all this land is subject to overflow during the season of high water.

The site of the station proper is composed of approximately 10 acres of made land extending about 1,400 feet on the river front. This is protected by a plank revetment, the depth of the land so protected is about 300 feet. This land is about 8 inches to 1 foot above the river at high water, and the work of filling and raising this land is done each year to maintain its level, as each year there is a certain amount of settling of this made ground. Canals divide this site, from which the silt deposited each year during high river is taken for the purpose.

Buildings.—Commanding officer's quarters, assistant surgeon and pharmacist's quarters, executive building and attendants' quarters, dormitory, mess hall and kitchen, hospital, wharf and shed for disinfecting apparatus, general storehouse, carpenter and blacksmith

shop, boathouse, launch shed. There are several small buildings, such as laundry rooms, servants' quarters, chicken houses, and cattle shed.

Floating equipment.—Steam tug *Assistance*, steam launch *Felicien*, 3 rowboats.

Wharves.—Main wharf of 400 feet in length, tugboat wharf, small freight wharf.

Disinfecting apparatus.—Three steam disinfecting cylinders with superheating coils, Holt pattern. Two sulphur dioxide fumigators, Kinyoun-Francis type, one installed on a car on the main wharf and the other installed on the tug *Assistance*.

Lighting and water supply.—An electric dynamo for lighting up the wharf during the night inspection of fruit vessels. Kerosene oil lamps are used for lighting all buildings. Rain water is collected in cisterns for drinking purposes; also river water, untreated, is pumped into cisterns for storage and general use.

Since the station was acquired by the service a number of repairs and small improvements have been made.

There is a local telephone system. The fire protection comprises 24 underwriter fire extinguishers and 2 force pumps, hose and reel.

THE MOBILE QUARANTINE STATION.

The service assumed charge of the station, situated near the mouth of Mobile Bay, on March 18, 1907, and on April 1, 1907, a medical officer of the service and a pharmacist were assigned to duty. During the fiscal year ended June 30, 1909, many improvements have been made to the station. These include repairs to the old hospital and old gangway.

The following new buildings have been constructed:

Medical officers' quarters, boathouse and attendants' quarters, two detention barracks buildings, a building for office, general kitchen and dining room, pharmacists' quarters and stores, a building for shop and laundry, and two small buildings for oils and paints and gas generator.

The work of the station is conducted by 1 medical officer, 1 pharmacist, and 13 attendants. All vessels are boarded in the open bay, about three-fourths of a mile offshore, from a launch or yawl boat. The boarding of vessels in the winter season, when the northers are of frequent occurrence, is sometimes difficult, dangerous, and even impossible. The north wind sweeps across 34 miles of Mobile Bay and produces a very rough sea at Fort Morgan. During the days when the northers are blowing, the launch is unsafe for boarding and is sent to Navy Cove, 3 miles distant, where she finds shelter, and the boarding is done from a yawl boat.

All vessels requiring disinfection go alongside the fumigating barge *Chipman*, which is anchored about three-fourths of a mile from the shore. She swings at one anchor and turns every day with the tide. An extra anchor is in reserve, ready to be dropped. On account of the swinging with the tide the barge is always in the most advantageous position for vessels going alongside for fumigation. The barge is equipped with sulphur pots, sulphur furnace, fan, sulphur hose, two steam chambers, bichloride tank, and electric-light

plant. She has a boiler which furnishes steam for the chambers, fan, electric lights, pumps, and hoists for anchors.

The barge is equipped with a wireless outfit owned and operated by the United Wireless Company.

Four attendants are stationed on the barge and act as keeper, engineer, cook, and deckhand, and look after the safety and care of the vessel and constitute the fumigating squad, assisted in actual fumigation by boatmen stationed ashore.

THE REDUCTION OF THE SOUTH ATLANTIC QUARANTINE TO THAT OF A STATION OF REFUGE.

During the fiscal year the personnel and property at the south end of Blackbeard Island, on which the South Atlantic quarantine station is located, was reconcentrated at the north end of the island, and the station as a whole reduced to that of a station of refuge.

This was made necessary for purposes of economy, the great diminution in the coasting lumber trade on the South Atlantic seaboard removing to a great measure the reasons which originally demanded a quarantine station on Blackbeard Island, Sapelo Sound, Georgia. The station, which will be conducted under a skeleton organization, will be always ready for use in the event of an emergency.

INSULAR QUARANTINE.

OPERATIONS OF THE SERVICE IN THE PHILIPPINE ISLANDS.

Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippines, reports on the quarantine transactions for the fiscal year ending June 30, 1909, from which the following is abstracted. In addition to his detail as chief quarantine officer, Doctor Heiser also holds the position of commissioner of health for the insular government:

The United States quarantine laws and regulations were enforced by officers of the service at the six ports of entry in the Philippines and at two other ports at which vessels from foreign ports may receive *pratique* by special arrangement.

At Manila and Cebu the service has first-class shore disinfecting plants, with ample facilities for detaining and housing the different classes of passengers and crews as may be necessary. At Iloilo a floating disinfecting plant is maintained, with limited accommodations for detaining a small number of steerage passengers. At Olongapo, Cavite, Zamboanga, Davao, and Jolo inspection stations are maintained, and when infected vessels are encountered they are remanded to Cebu or Manila.

From the foregoing it may be seen that the service is in position to maintain surveillance over all shipping that enters the Philippines from other countries.

The quarantine during the year has been entirely effective, so far as known no quarantinable disease having been introduced.

The question of the quarantine inspection of foreign vessels is a most important one, especially with regard to plague, because this latter disease was only eradicated from the Philippines in 1906, after a strenuous effort which lasted over a period of seven years and cost many lives and much money.

In view of the fact that the Philippines are in almost daily communication with near-by plague-infected countries by means of vessels making the voyage in a few days, only constant vigilance offers any hope against the reintroduction of plague. During the past few years this danger has been greatly increased on account of the fact that the construction of wharves for deep-sea vessels in the near-by foreign countries, as well as in the Philippines, is becoming more and more common, and this presents a new danger from a health standpoint, because the embarkation and disembarkation of plague-infected rats is correspondingly increased.

Personnel.—The chief quarantine officer was absent from August to January on an official detail to the International Congress on Tuberculosis at Washington, D. C.; a conference on Chinese immigration with the Departments of State and of Commerce and Labor; a visit to the leper colonies at Molokai and Louisiana; delegate to the Southern Medical Association at Atlanta; and on detail to Ham-

burg for the purpose of making a report upon the fumigation of vessels by carbon dioxide gas.

The roster of officers of the service on duty in the Philippine Islands was as follows: Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippine Islands.

Manila: Passed Asst. Surg. Victor G. Heiser, in command; Passed Asst. Surg. Allan J. McLaughlin (exclusive duty with bureau of health), Passed Asst. Surg. R. E. Ebersole, Asst. Surg. J. R. Hurley, Pharmacist, and Cashier N. C. Comfort.

Mariveles: Acting Asst. Surg. William J. Linley.

Iloilo: Asst. Surg. Robert Olesen.

Cebu: Passed Asst. Surg. H. G. Ebert.

Zamboanga: Acting Asst. Surg. H. H. Johnson.

Jolo: Acting Asst. Surg. W. T. Davidson.

Olongapo: Acting Asst. Surg. C. F. Ely.

Cavite: Acting Asst. Surg. H. Butts.

Davao: Acting Asst. Surg. Max Becher.

Cholera.—While the service was not directly concerned in the cholera epidemic which occurred in the islands during the first half of the fiscal year, yet considerable extra work was occasioned it on account of the outgoing quarantine measures which had to be imposed upon vessels, as well as the cholera-infected vessels that arrived at ports of entry from inter-island ports. These may be said to have been as effective as could be expected. One case of cholera occurred October 11 on the United States army transport *Liscum* after the same had been released on October 10, one day's quarantine detention having been undergone at Mariveles. After attempting to take care of the case, the vessel finally put in at the Cebu quarantine station and was thoroughly disinfected, after which no further cases occurred.

Another case occurred on the United States army transport *Buford*, which left Mariveles October 15, after undergoing one day's quarantine detention, in a patient who was directly transferred to the ship's hospital from the division hospital, Manila, with a certificate of an army medical officer that it had not been exposed to infection during the preceding five days. The exact date of its detection was not learned, but it happened before the vessel's arrival at Nagasaki on October 20.

The steamship *Panay* left Manila September 26 and arrived at Iloilo September 28 without having undergone quarantine detention. A case of cholera was found aboard a few hours after arrival. No quarantine was imposed upon this vessel originally, because it was proceeding from an infected port to another infected port.

The foregoing shows that it is not advisable to make the quarantine detention for outgoing vessels less than two days at least, but there has been nothing occurring which would change the opinion expressed in the annual report of 1906 that a quarantine of five days was not necessary as a rule.

The outgoing United States army transport *Sheridan*, which was placed in quarantine September 14, developed one case of cholera the same day and another on September 16, which was the date upon which the complete disinfection was finished. The vessel was held to complete five days and no further cases occurred.

On January 31 a small sailing vessel, with 8 passengers and crew, upon which occurred a case of cholera, was disinfected at Cebu upon request of the insular district health officer.

April 13, while the sailing vessel *Lolita*, bound from Escalante to Iloilo, was undergoing incoming quarantine detention at Iloilo, a case of cholera developed among the crew. The vessel and personnel were promptly disinfected and no further cases occurred.

At Iloilo seven other vessels were disinfected on account of cases occurring while the vessels were lying in the harbor, but as all of them had been in port from over five days to several weeks, it is evident that the infection was contracted in Iloilo, and the disinfections were rather in the nature of a courtesy to the local authorities.

The spread of the cholera during the year, from island to island, never took place from ports at which the service has officers nor did it enter any such ports. If it were possible to take the same measures at all the ports of the islands, the spread of cholera from island to island could be prevented with reasonable assurance, but unfortunately this is not practicable: First, for want of funds, and second, lack of trained officers.

The results obtained by the service during the past year, however, have again shown in a forcible manner that trained officers can prevent the introduction of cholera into a country and also protect vessels that are bound from infected territory to United States ports against having the disease occur aboard. The detection of cholera and its prompt eradication from a transport which is loaded with hundreds of soldiers results in the direct saving of many lives and protects the United States from the likelihood of invasion, and is a sanitary achievement which goes far to show the necessity of modern health organization.

Leprosy.—The Mariveles quarantine station disinfected five vessels, and the Iloilo station one vessel, on account of the fact that they had carried lepers. Five lepers were detected at the quarantine inspection of incoming vessels.

The Insular Government has been steadily continuing the policy of transferring all of the lepers in the Philippines to the island of Culion. During the year, 1,318 were sent to that colony, and all of the provinces, with the exception of Moro and Nueva Ecija, have been gone over, and many of them a number of times, and all known lepers taken away. Before segregation was commenced it is estimated that there were at least 700 new cases each year, and now there are not over 300 in the same period, so that this policy is apparently being thoroughly vindicated. In other words, in 1906, when segregation was begun, there was approximately 1 leper for every 2,000 of the entire population of the archipelago, and now it is estimated that there is only 1 for every 2,800. The island of Cebu, with its area of 1,939 square miles and its dense population of 700,000, had 1 leper out of every 460 of the population. As was to be expected in an island so thoroughly infected, a greater number of incipient cases was encountered during the year than on the other islands.

Considerable success has been had in the treatment of leprosy by the X ray and also with crude chaulmoogra oil.

The work of segregation has been continued without great opposition and may be said to be well supported by public opinion. The

policy of not permitting nonleprous persons to reside at Culion has been strictly adhered to, and in the end such course is for the benefit of the patients, for the protection of the public, and the best interests of all concerned.

Plague and rat-proof wharves.—There have been no cases of plague in the Philippines since April, 1906, and the interest of the service consists in preventing its introduction. This is an undertaking of no small proportions, because the Philippines are in almost daily communication with countries that are plague infected, and only a few days' steaming distance from the Philippines.

The number of wharves suitable for deep-draft ocean vessels that are being constructed annually in the ports of the Orient is increasing very rapidly, and in consequence the danger of plague-infected rats being conveyed from port to port and country to country has been multiplied many times. To offset this danger the new wharves which were recently completed in Manila have been made rat proof, in so far as rats gaining access to the shore is concerned. The girders under the floors have been rounded and near the shore end a steel flashing extends across the entire underside. Upon the wharf proper the wharf shed, or superstructure, is built of iron and all openings in this are permanently closed with a solid steel partition which extends at least a meter above the floor. The driveway has a solid steel lift gate, which is operated by an attendant while traffic is going on. A good breed of rat-catching cats is kept on the wharf, as well as rat traps and funnels on all the lines of all vessels that make fast to the wharf.

In addition to the foregoing, all vessels that ply between the Philippines and plague-infected ports are fumigated about every six months, or oftener if necessary. At Iloilo and Cebu the wharves are parallel with the shore, and owing to their greater length against the shore it is not practicable to use the Manila plan, and the measures are necessarily confined to fumigation of vessels and the use of tarred lines and funnels.

Smallpox.—This disease was encountered a number of times upon incoming vessels. On September 5 the steamer *Changsha*, a passenger vessel that runs between Japan, China, the Philippines, and Australia, was found to have a case on board upon the vessel's arrival in Manila. On November 16 the steamer *Islas Filipinas* was remanded from Zamboanga to Cebu for disinfection on account of smallpox. On February 27 the steamer *Indrapura* had a case among her crew which was probably contracted in Japan. May 14 the *Escalante* arrived at Iloilo with a case aboard. On June 9 the steamer *Magallanes* had a case, and upon June 28 a second case occurred after the vessel returned from a trip.

All of the foregoing cases occurred in persons who could not show a good vaccination mark.

Smallpox in the Philippines, especially the severe form, is rapidly becoming less common, as vaccination becomes more general. In Spanish times in Manila alone as many as 260 deaths occurred from smallpox during one month, whereas in the past few years, the deaths have never exceeded 10, and these occurred mostly in antivaccinationists.

Extension of United States quarantine outposts in the Orient.—During the month of May the floating disinfecting plant which was

used at Cebu before the shore plant was built at that station was sold by the service for use at the port of Amoy, China. The effects of passengers and crew bound for United States ports are now being disinfected at Amoy, when necessary, by a regular officer of the service. This arrangement has expedited matters very much for the vessels that sail for United States territory and saves them much delay and annoyance, which was unavoidable before these better facilities were provided.

Building and equipment.—The Mariveles quarantine station suffered considerable damage by the typhoon which passed near Manila last December.

The large disinfecting building was unroofed and the structure itself was partially blown over. The cabin bath building had the porches torn away and considerable other damage was caused.

Toward the close of the fiscal year authority was granted to draw upon the insular government insurance fund for the amount required to replace the building.

The rapid deterioration of structures in a tropical climate by white ants, teredos, and dry rot, of which mention was made in the last annual report, still continues and causes much work and study to find means to overcome it. A large portion of the Mariveles wharf was replaced by specially prepared creosoted timber, and another experiment is now under way of installing reenforced concrete piles and decking. If the latter construction can stand without danger the thrust strain of large vessels coming alongside, the question of wharf construction may be said to have been solved, and thereafter it will only be a matter of funds. The cost of concrete construction will be about double that of ordinary wood construction, but as it will last indefinitely, while wood only lasts from two to three years, it will be seen that in the first six-year period even the concrete construction would be the most economical.

Vessels boarded.—A total of 4,254 incoming vessels were boarded and inspected on arrival at the ports of entry in the islands. At Manila, 969 were boarded; at Iloilo, 344; at Cebu, 2,793; and at the other ports, 148.

Vessels disinfected.—There were disinfected at the several stations of the service a total of 68 vessels. Six vessels were disinfected on account of smallpox having occurred aboard; 14 were disinfected on account of cholera; 6 on account of being employed in transporting lepers to the leper colony, and the remainder were disinfected because of having been at infected ports, having carried infected animals or cargo, or en route to the United States. A large number of partial disinfections were constantly necessary of vessels with tuberculosis, measles, typhoid fever, or similar diseases having occurred on board during the voyage, or patients brought to the larger cities for treatment, or for segregation in the leprosarium or contagious disease hospitals. Vessels in the river and bay have been from time to time disinfected at the request of the bureau of health, and all vessels transporting cattle have been disinfected when the cattle have been found infected by the bureau of agriculture.

Vaccination.—In order to protect human life and to avoid delays, losses, and annoyances to local shipping, the endeavor during the year has been to keep all members of crews of interisland vessels as immune as possible to smallpox. At Manila 785 members of crews were

vaccinated, of which number there were 155 known "takes," and 124 were vaccinated more than twice without "takes." In view of the thorough vaccination of the entire population of the localities from which crews are secured the number of "takes" from service vaccinations diminishes each year. The quadruple-card system, outlined in a previous annual report, has proved very satisfactory and is still in use. Virus prepared by the Manila bureau of science is used and has been above the average for potency. At the Manila station 5,927 vaccinations were performed, divided as to personnel as follows: Three thousand six hundred and seventy-one were incoming passengers, principally from the China coast; 297 were smallpox contacts on vessels; 785 were passengers bound for the United States; 283 were crews of foreign vessels; and 891 were crews of interisland vessels. Incoming steerage passengers from foreign ports who did not show evidence of recent successful vaccination, or from plague-infected ports, have also been vaccinated on arrival. This continued effort to admit, if practicable, no unvaccinated persons into the port cities, together with the vaccination of the residents, has almost entirely eradicated smallpox from these populous centers. During April the office force also vaccinated upward of 500 persons, principally government employees, who became alarmed because an unvaccinated antivaccinationist died of smallpox.

Vessels fumigated.—All the vessels engaged in the interisland trade were required to undergo fumigation once in every six months. Vessels in the Hongkong-Manila service are also required to be fumigated every six months and each time they are dry docked. Vessels coming from the coast of China where plague is present and no regular officer is stationed are fumigated at frequent intervals at ports in the Philippine Islands. During the year 182 vessels were fumigated. At Manila 128 vessels were thus treated, at Iloilo 15, and at Cebu 39. The pot method of burning sulphur has been used almost exclusively, and for exterminating vermin from vessels that are empty has proven very satisfactory.

Outgoing quarantine.—United States consular bills of health were issued to 123 vessels. Said vessels were bound for all parts of continental United States and also for many ports in the insular possessions. Of these vessels 12 were disinfected and 15 were fumigated throughout prior to loading for America. Of the United States army transports bound from the Philippines to New York, Seattle, or San Francisco, 13 were partially disinfected and their crews and steerage passengers bathed and their effects and baggage disinfected. In connection with this outgoing quarantine of vessels destined for United States ports, 28,120 pieces of baggage were disinfected, 26,333 pieces were passed and so labeled after inspection; 497,070 pieces of cargo were investigated as to source and liability of conveying infection, 495,750 pieces of which were passed and so certified, and 1,320 pieces were disinfected. The interisland outgoing quarantine is considered under another subhead.

Aid to other services.—(1) Board of marine examiners: The physical examinations of all applicants for license as masters, mates, and engineers on vessels registered in the Philippine Islands were made by the officers of the service. The local law demands a full physical examination such as is prescribed for officers in the Revenue-Cutter

Service. There were 121 examinations made, of which number 94 passed and 27 were rejected.

(2) Immigration: At the ports of entry in the Philippine Islands, officers of the service inspected during the year 7,718 arriving aliens. Of this number, 22 were certified as having excludable disease, or conditions that would affect their ability to earn a living. Of the number certified, 17 were deported, 4 landed, and 1 remains in the islands awaiting deportation or decision as to residence.

(3) Light-house service: The service maintained a light on Mariveles Bay for the benefit of navigation, the supplies being furnished by the insular government and the work in connection with lighting and care of the light was furnished by the quarantine service. Physical examinations of employees of the light-house service are made when requested.

(4) Bureau of civil service: Special physical examinations were made of civil employees or applicants for certain positions, when so requested by the director of civil service. Aid in examination work was also given on a number of occasions.

(5) Weather bureau: Storm signals were displayed at Mariveles Bay for the weather bureau. Mariveles Bay being the best refuge in this vicinity during typhoon weather, this station is one of the most important in the islands.

(6) Bureau of agriculture: Owing to the prevalence of cattle diseases, especially rinderpest and surra, a large number of vessels which arrived with infected cattle aboard were disinfected by the service at the request of the director of agriculture.

(7) Bureau of health: The work of the bureau of health and the bureau of quarantine service overlaps at times, and the service has always been ready and willing to do all in its power to increase the efficiency of the specific measures adopted for the sanitary betterment of the archipelago. Hides, animal and vegetable food products, and their shipment were supervised throughout the year, vessels in the river and bay were disinfected on account of disease having occurred aboard, and the vessels used to convey lepers from one port to another and to the Culion leper colony were disinfected. At Cebu the service officer took an active part in the local sanitary work, especially as regards quarantinable diseases, vaccination, and general public-health work; and in Manila hundreds of persons were vaccinated at the quarantine office.

(8) Bureau of education: A number of students bound for the United States to complete their education, either at government or private expense, were examined physically, as were the candidates for entrance to West Point.

(9) Bureau of navigation: Physical examinations were made of officers and men to determine their fitness for promotion or for new positions in the coast guard service. Cutters and launches were disinfected and crews vaccinated and a general supervision had over the sanitary condition of the coast guard fleet. Quarters were furnished at quarantine stations for repair parties on public work.

(10) Coast and geodetic survey: Upon request, physical examinations of officers and men, either as applicants for positions or for promotion, were made.

(11) Bureau of posts: Every possible aid was tendered the postal authorities at the different ports and quarantine stations, in order that the mail might be dispatched promptly during the ordinary routine and during the trying outgoing quarantines on account of cholera. At Iloilo for a long time the quarantine launch carried the mail ashore from arriving vessels.

(12) United States Army: A number of transports were disinfected on account of having measles or other nonquarantinable diseases on board. Lighters and launches were fumigated and disinfected. Vessels of the interisland transport fleet were fumigated once each six months. Quarters at Mariveles were provided for home-going regiments for periods from five to forty days, and accommodations were frequently provided for as many as 1,000 persons. Mapping parties of the army were also quartered at the station for considerable periods.

Immigration.—In the last annual report it was stated that about 5,000 Chinese persons, many of whom had been residents of the Philippines for periods varying up to thirty years or more, were being refused transportation in China to the Philippines by the steamship companies because of the ruling that all persons who were not citizens of the United States or expressly covered by the treaty of Paris must be regarded as aliens and meet the requirements of the United States immigration laws and regulations before they could be admitted to United States territory. It was estimated that about 3,000 were being detained at Amoy alone. It was most difficult for those affected by this ruling to understand why they could not return to the Philippines. Many of them had large property interests in the islands and considered them more as their permanent domicile than they did China. At the request of the insular government, Passed Asst. Surg. Victor G. Heiser was ordered to Amoy for the purpose of ascertaining whether some relief could not be extended. He found that many of them had undergone treatment and had been cured of the eye diseases which they thought might prevent their landing in the Philippines. The steamship companies were notified, and a large number soon reached the Philippines and were landed. This relieved the tension for the time being, but it was obvious that large numbers could not hope to pass the immigrant medical examination.

On account of the fact that the public health would not be seriously menaced by their admission, and since it was believed to be only fair and just that persons who had lived in the islands long before American occupation should be permitted to return, the governor-general named Passed Assistant Surgeon Heiser, who was in Washington attending the International Congress on Tuberculosis, to act as his representative in bringing this matter to the attention of the State, War, and Commerce and Labor departments.

As a result of this conference, and upon the recommendation of the Bureau of Immigration, the War Department on December 21, 1908, approved and the governor-general put into effect an order which exempted Chinese persons who were properly domiciled in the Philippines from the requirements of the United States immigration laws and regulations.

The foregoing decision has greatly reduced the work connected with the medical inspection of aliens, because the majority of persons who come into the Philippines, exclusive of the army, are Chinese who have a domicile here.

Statistics.—The tables of statistics of quarantine transactions covering the individual ports of the Philippines, and a tabulated summary showing all the work done in the islands, together with the financial statement, follow in the order named.

SUMMARY OF QUARANTINE TRANSACTIONS, BOTH INCOMING AND OUTGOING, FOR THE PHILIPPINE ISLANDS, FISCAL YEAR ENDED JUNE 30, 1909.

	Manila.	Iloilo.	Cebu.	Cavite.	Olongapo.	Zamboanga.	Jolo.	Total.
Vessels inspected.....	1,275	547	2,793	43	.....	75	30	4,763
Vessels detained in quarantine.....	143	13	100	.....	.....	.....	.....	256
Vessels disinfected.....	50	9	9	.....	.....	.....	.....	68
Vessels fumigated to kill vermin.....	128	15	39	.....	.....	.....	.....	182
Bills of health issued.....	1,764	117	135	45	.....	.....	.....	2,061
Pieces of baggage disinfected.....	36,066	239	1,011	.....	.....	.....	.....	37,316
Pieces of baggage inspected and passed.....	27,692	37	175	.....	.....	.....	.....	27,904
Pieces miscellaneous cargo certified.....	495,750	71,200	83,146	.....	.....	.....	.....	650,096
Cases quarantinable diseases detected on vessels.....	5	10	3	.....	.....	.....	.....	18
Persons detained in quarantine.....	7,696	250	4,862	.....	.....	.....	.....	12,808
Crew inspected.....	90,883	13,943	52,134	9,195	.....	4,361	1,430	171,946
Passengers inspected.....	54,879	6,219	18,570	62	.....	2,160	443	82,333
Persons vaccinated.....	5,927	101	132	.....	.....	.....	.....	6,160
Persons bathed and effects disinfected.....	14,119	138	350	.....	.....	.....	.....	14,607

FINANCIAL STATEMENT.

A.—General appropriation bureau of quarantine service.

Balance, former fiscal year appropriations.....	\$25,750.700
Appropriation, act 1873, fiscal year 1909.....	62,500.000
Collections available for expenditure.....	8,771.940
Total available.....	97,022.640
Expended during the fiscal year 1909.....	70,551.735
Unexpended balance, June 30, 1909.....	26,470.905
Total.....	97,022.640
Outstanding obligations (estimated), \$17,230.935.	

B.—Appropriation for public works and permanent improvements.

Balance appropriation, act 1342.....	\$789.630
Expended during fiscal year 1909.....	171.420
Unexpended balance, refunded to Treasury.....	618.210
Total.....	789.630
Outstanding obligations, none.	

Expenditures, details.

Compensation of personnel.....	\$40,850.620
Office and general service expenses.....	1,815.085
Launch and barge expenses.....	7,994.465
Station supplies and disinfectants.....	6,561.025
Repairs to buildings and wharves.....	12,264.165
New construction and new equipment.....	1,237.795
Total expenditures, United States currency.....	70,723.155

Expenditures by station.

Manila :	
General service expenses	\$17,408.315
Launch expenses	5,656.670
New station equipment	238.790
	<hr/>
	23,303.775
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Mariveles :	
General service expenses and supplies	13,916.500
Repairs to buildings and wharves	10,689.850
New construction and equipment	651.190
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	25,257.540
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Iloilo :	
General service expenses	3,705.455
Launch and barge expenses	3,499.815
	<hr/>
	7,205.270
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Cebu :	
General service expenses	6,207.245
Launch expenses	6,019.965
Repairs to buildings, wharves, and reservation	1,652.570
New construction and new equipment	349.290
	<hr/>
	14,229.070
	<hr/>
Jolo :	
General service expenses	240.000
Zamboanga :	
General service expenses	480.000
Davao :	
General service expenses	7.500
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Total	70,723.155
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OPERATIONS OF THE SERVICE IN HAWAII.

From the report of the chief quarantine officer, Passed Asst. Surg. W. C. Hobdy, the following facts are abstracted :

The work of the service in Hawaii may be described under three heads: First, quarantine operations; second, marine-hospital work; and, third, plague-preventive measures.

QUARANTINE OPERATIONS.

There has been no outgoing quarantine during the year.

Orientals detained in quarantine for observation	3
Europeans detained in quarantine for observation	2
Baggage disinfected	pieces 1,782
Persons treated for diseases other than quarantinable	5
Days treatment furnished above persons	50
Vessels fumigated with SO ₂	45
Vessel disinfected with 1 in 1,000 "bichloride" solution	1
Autopsy	1
Cremation	1
Number of deaths on station	1

INCOMING TRANSACTIONS AT HONOLULU NATIONAL QUARANTINE STATION, FISCAL YEAR ENDED JUNE 30, 1909.

Month.	Steam vessels inspected.			Sailing vessels inspected.		
	Number.	Crew.	Passengers.	Number.	Crew.	Passengers.
1908.						
July.....	39	13,090	3,323	15	218	10
August.....	28	3,660	3,876	8	117	13
September.....	38	8,904	3,872	4	57	1
October.....	40	10,812	3,862	8	117	10
November.....	19	3,672	4,555	7	113	6
December.....	19	2,390	4,234	9	128	9
1909.						
January.....	29	4,388	3,890	9	175	9
February.....	18	2,105	2,115	6	80	1
March.....	28	3,571	4,042	12	177	4
April.....	20	4,117	3,856	8	117	8
May.....	27	3,865	5,960	12	187	15
June.....	22	5,565	5,375	8	104	3
Total.....	327	66,139	48,960	106	1,590	89

Many of these vessels came from ports infected with one or more of the following diseases: Plague, cholera, yellow fever, and small-pox. There has been no case of infection from any of these diseases during the fiscal year.

INCOMING TRANSACTIONS AT SUBPORT OF HILO, FISCAL YEAR ENDED JUNE 30, 1909.

Month.	Steam vessels inspected.			Sailing vessels inspected.		
	Number.	Crew.	Passengers.	Number.	Crew.	Passengers.
1908.						
July.....	0			2	27	3
August.....	1	41	17	2	21	
September.....	0			0		
October.....	1	40	15	1	14	
November.....	1	38	6	2	23	3
December.....	1	38	16			
1909.						
January.....	1	38	6	2	27	
February.....	1	39	3	2	26	
March.....	0			1	9	
April.....	1	38	4	3	54	4
May.....	1	40	8	1	14	1
June.....	1	39	15	1	11	
Total.....	9	351	90	17	226	11

INCOMING QUARANTINE TRANSACTIONS AT SUBPORTS, FISCAL YEAR ENDED JUNE 30, 1909.

Subport.	Steam vessels inspected.			Sailing vessels inspected.		
	Number.	Crew.	Passengers.	Number.	Crew.	Passengers.
Mahukona, Hawaii.....				10	95	2
Kahului, Maui.....	2	73		9	176	2
Kihei, Maui.....	1	44				
Lahaina, Maui.....				1	13	
Koloa, Kauai.....				3	32	3
Total.....	3	127		23	316	7

MARINE-HOSPITAL WORK.

Summary for fiscal year ended June 30, 1909.

Patients remaining under treatment from previous year-----	11
Patients admitted during the year-----	139
Revenue-cutter seamen treated-----	0
Foreign seamen treated-----	0
Surgical operations-----	0
Deaths-----	4
Remaining under treatment at the close of the fiscal year-----	10
Outpatient relief:	
Cases treated-----	455
Times relief furnished-----	839
Foreign seamen treated-----	0
Cases rejected-----	3
Physical examinations-----	10
Days relief furnished-----	3, 890

PLAGUE-PREVENTIVE MEASURES.

This service was asked to cooperate with the board of health in an effort to destroy the rats in the city of Honolulu, and thus aid in the general work of preventing the recurrence of plague. During the year 36,400 rats have been captured, and of this number practically 35,000 have been subjected to bacteriological examination in the plague laboratory of the quarantine station. None showed plague infection.

QUARANTINE IN PORTO RICO.

The chief quarantine officer for Porto Rico, Passed Asst. Surg. S. B. Grubbs, stationed at San Juan, transmits a report for the fiscal year ending June 30, 1909, in substance as follows:

The operations of the service in Porto Rico include:

First. The quarantine service both incoming and outgoing.

Second. The medical relief of American seamen.

Third. The medical inspection of immigrants.

Fourth. Physical examinations for various government services.

The headquarters for the quarantine service are at San Juan, the other stations being Ponce, Mayaguez, Fajardo, Humacao, Arecibo, Aguadilla, and Arroyo. The operations at all of these ports are under the supervision of the chief quarantine officer to whom the various quarantine officers report regularly and confer by mail or telegraph on all questions of importance. Frequent inspections are also made by the chief quarantine officer.

The island of Porto Rico, situated in the eastern part of the West Indies, is naturally in the path of the many vessels in the West Indian and South American trade. With its dense population, its tropical climate, and imperfect sanitation, it is naturally highly infectible territory, especially for yellow fever and plague, and these diseases have been constantly present in the neighboring islands and mainland of South America.

The policy of ample protection with the least amount of obstruction to commerce has been followed consistently and with success. The most alarming danger has been the presence of bubonic plague in Venezuela and Trinidad. In the former country the epidemic of

1908 had hardly subsided when, on May 21, a new case was reported at Caracas, to be followed quickly by several others, practically proving that the disease has been constantly present among the rats, and that the quarantine measures against these ports were very necessary even after a lapse of six months without a human case.

At present, through the cooperation of the Venezuelan Government and the shipping interests, commerce with Venezuela is being carried on with but little delay, and with slight danger. Precautions taken at La Guaira and Porto Cabello to prevent rats boarding vessels, and the fumigation there of vessels when empty, make it possible to allow some of the steamers to come to the wharf at San Juan under certain restrictions for a few hours, and to reduce the detention of passengers to five days from the port of departure.

The chief quarantine officer, in accordance with orders received from the bureau, inspected the cities of Caracas, La Guaira, and Porto Cabello, in Venezuela, after the second outbreak of plague in the first-named city, and with Acting Asst. Surg. W. H. Kellogg, detailed at the United States consulate in La Guaira, made arrangements to minimize as much as possible the danger of rats getting aboard vessels at La Guaira and Porto Cabello.

A number of points in close communication with Porto Rico have been infected with yellow fever, notably Barbados, Trinidad, Cuba, Curaçao (one imported case), and several of the Venezuelan ports, as well as the port of Fort de France, and vessels from ports suspected of infection have been fumigated and passengers held five days from date of arrival at San Juan, or from the port of departure, depending upon circumstances.

One case of yellow fever was removed from the steamer *Julia* from Santiago de Cuba on July 5, 1908. This case was immediately discovered on inspection, although the passenger was in the early stages of the disease and declared himself in good health. This incident showed the care with which the quarantine examination was conducted. Quarantine was raised on vessels from Cuban ports by bureau circular letter of March 22, 1909.

At all the ports of the island having quarantine officers not only are inspections made, but when necessary the ordinary fumigation of vessels can be done.

The plans for the new buildings to be built under the appropriation made by Congress have been submitted to the bureau, and the construction of the buildings will be effected by the Supervising Architect. They will add much to the comfort of the personnel of the station and of any passengers who may be detained there. The force at San Juan consists of 1 commissioned officer, 1 acting assistant surgeon, one pharmacist, and 16 attendants.

During the year the following business was transacted at the ports of the island:

Quarantine service at San Juan, Porto Rico, during the year ending June 30, 1909.

Vessels inspected	227
Vessels held in quarantine	30
Vessels disinfected	11
Passengers inspected	15, 610
Passengers detained	354
Crew inspected	14, 750
Bills of health issued	406

Relief to American seamen.

Seamen treated in hospital.....	88
Seamen treated as outpatients.....	141
Ponce:	
Vessels inspected.....	154
Vessels in quarantine.....	55
Vessels disinfected.....	13
Passengers inspected.....	9,803
Crew inspected.....	8,267
Passengers detained in quarantine.....	118
Pieces of baggage disinfected.....	53
Bills of health issued.....	332
Mayaguez:	
Vessels inspected.....	69
Vessels held in quarantine.....	23
Vessels disinfected.....	3
Passengers inspected.....	2,507
Crew inspected.....	3,148
Bills of health issued.....	245
Immigrants inspected.....	66
Fajardo:	
Vessels inspected.....	28
Passengers inspected.....	80
Crew inspected.....	96
Bills of health issued.....	33
Immigrants inspected.....	90
Aguadilla:	
Vessels inspected.....	18
Vessels held in quarantine.....	5
Passengers inspected.....	433
Crew inspected.....	833
Bills of health issued.....	92
Arecibo:	
Vessels inspected.....	19
Vessels held in quarantine.....	3
Passengers inspected.....	174
Crew inspected.....	659
Bills of health issued.....	25
Arroyo:	
Vessels inspected.....	1
Crew inspected.....	10
Bills of health issued.....	99
Humacao:	
Vessels inspected.....	1
Crew inspected.....	26
Bills of health issued.....	62

FOREIGN QUARANTINE.

The duties of officers of the Public Health and Marine-Hospital Service detailed at foreign ports are as follows:

First: The investigation into the previous whereabouts and the past and present sanitary history of all vessels destined for ports in the United States, its possessions and dependencies.

Second: The inspection of vessels, crews, and passengers, and the certification of freight.

Third: The fumigation of ships to kill rats and mosquitoes, or the disinfection of ships when necessary.

Fourth: The observation, if necessary, under detention, of intending passengers for ports in the United States and its dependencies.

Fifth: Weekly reports of transactions.

Sixth: Weekly reports as to the health and sanitary conditions of the foreign port, and when possible of the country contiguous thereto.

Seventh: The certification, in conjunction with the United States consular officers of the bills of health issued, said certification to be made just prior to the departure of the ship and to cover all requirements provided for by the United States quarantine regulations.

FRUIT PORT INSPECTION SERVICE.

Acting assistant surgeons were detailed in accordance with custom to enforce at certain foreign fruit ports the quarantine regulations relating to fruit vessels, which permit the entry of such vessels to ports in the United States without detention at quarantine stations.

The reports from the officers at the several stations follow:

BELIZE, BRITISH HONDURAS.

Acting Asst. Surg. C. L. Mengis reports as follows:

Season of 1908 (July 1 to October 31). Forty-four steamers and 9 sailing vessels were inspected, and 7 steamers were fumigated. There were 1,345 crew and 394 passengers on steamers, and 58 crew on sailing vessels. During this period health conditions were reported as good.

Season of 1909 (April 1 to June 30). Twenty-eight steamers and 7 sailing vessels were inspected, and 1 steamer fumigated. There were 866 crew and 358 passengers on these vessels. The passengers examined prior to their departure from the port of Belize for American ports numbered 121, and those examined in transit numbered 233.

Doctor Mengis reports the health conditions of Belize during the fiscal year to have been excellent.

There were a few cases of smallpox at Stann Creek, a small Carib settlement 30 miles from Belize, but conditions were handled so carefully that the disease was soon eradicated and confined to that locality.

All of the cisterns in the town of Belize are screened and are inspected by two officers detailed for the purpose, and with few exceptions there are no breeding places for the *Stegomyia calopus*. The streets are kept free from trash or rubbish and the sanitary condition of the town is uniformly good.

All quarantine matters in Belize are regulated and governed by the quarantine ordinance of 1907. The governor in council has the power to declare any port or place infected, and at the close of the last fiscal year the following places had been so declared: The island of Cuba; the island of Trinidad; Colon and the Isthmus of Panama; the Atlantic coast of Honduras; the Bay Islands and Ruatan; the Atlantic coast of Guatemala; Brazil; the ports of Veracruz and Progreso; Ascension Bay and the coast of Mexico.

All vessels are boarded by the health officer of the port, and the passengers and crew examined; those coming from infected places are kept under medical surveillance for six days from date of arrival. The water receptacles of the smaller boats are examined and if mosquito larvæ are found the barrels are emptied and water supplied free at the hospital. All such vessels are fumigated with 2 per cent sulphur dioxide gas.

In cases where vessels bring bad bills of health or have infected or suspected cases on board, the passengers are detained at the observation station situated at the extreme end of Newtown Barracks, about a mile from town, for the required number of days, the suspicious case or cases being removed to the isolation hospital at Moho Caye, about 3 miles from town.

In order to be in a better position to deal with disinfection and fumigation, two Clayton's disinfectors have been imported into Belize and are now ready for service. The one for use at sea is installed upon a large lighter and is worked by a motor. This is known as Type C, the cost of which was \$5,000. This machine is highly effective in its germicidal and vermin destroying properties. The smaller disinfecter is known as "Type M," a hand machine especially suitable for use in houses.

Weekly reports are received from the British consuls in all the neighboring republics.

The River Hondo, the boundary line between Honduras and Mexico, is patrolled by a motor boat under a customs officer, both for revenue and quarantine purposes. The customs officer keeps the medical authorities informed as to the existence of diseases prevalent. All the Cayes to the north of the colony are under the supervision of such an officer.

General sanitary improvements and precautions.—Every district is under a competent medical officer who sends a weekly report as to the sanitary condition of his district, the prevailing diseases and general conditions.

During recent years extensive antimalarial measures have been carried out in Belize and the principal towns in the colony, such measures including the cutting down of bushes, attention to drains, and the filling in of ditches and swamps.

The people are being educated by lectures on tropical hygiene, as to sanitary matters in general, and the precautions to be taken against infection from the various tropical diseases.

Steps have been taken for the destruction of rats, "ratin" being used in the government public buildings.

The removal of garbage from houses and streets is effected daily by the use of city carts. The streets are well paved and are arranged so that they drain rapidly.

The general health conditions for the last three years have been good. The authorities have successfully coped with epidemics of dengue, influenza, and quickly stamped out smallpox in the Stann Creek district.

BOCAS DEL TORO, PANAMA.

Acting Asst. Surg. Paul Osterhout reports as follows:

Season of 1908 (July 1 to October 31). Sixty-nine vessels, with 1,941 crew and 79 passengers, were inspected.

No infectious or contagious diseases appeared in this port during the year.

The general health conditions of the town and the surrounding territory have been good.

The work of grading the town, which was given out by the Panama National Government in the form of a contract, is nearing completion. No attempt has been made to provide a water system, and the people continue to use tanks and barrels.

The Isthmian Canal Commission continues to maintain a sanitary corps at this post. Under these conditions all tanks and barrels are screened, breeding places for mosquitoes destroyed, and cans, bottles, and general garbage gathered and burned.

Season of 1909 (April 1 to June 30). Sixty-five vessels, with 2,060 crew and 184 passengers, were inspected. Health conditions in the port remained satisfactory.

The last case of yellow fever to occur at Bocas del Toro, which originated there, died February 21, 1906. No other quarantinable diseases have appeared since that date.

For about three years prior to April 1, 1909, the Isthmian Canal Commission had charge of the sanitation of the port and supervised the maritime quarantine. Since that date the maritime quarantine and sanitation have been turned over to the Panama Government and are under the direction of the Panama Government medical officer for the port. There is an agreement between the Isthmian Canal Commission and the Panama Government (by treaty or otherwise) by which the Isthmian Canal Commission can enforce quarantine regulations in any port of the Republic to their satisfaction, and since their withdrawal from the port they have given additional power to the Panama medical officer to enforce maritime quarantine regulations.

All vessels on arrival are boarded by this officer and a close inspection carried out.

The contract for raising the grade of Bocas del Toro, which was made by the Panama National Government about three years ago, is nearly completed, and it is now possible to traverse very nearly all parts of the town with carts and horses. The garbage of the town is gathered up daily and disposed of by burning. Mosquito eradication is now going on, but owing to lack of material for covering barrels and tanks the work is delayed.

There is no doubt that the conditions have been greatly improved in the past three years, and the Government appears to be sincere in its endeavors to comply with whatever measures are deemed proper for a better sanitary condition of the port.

BLUEFIELDS, NICARAGUA.

Acting Asst. Surg. T. B. L. Layton reports as follows:

Season of 1908 (July 1 to October 31). Twenty-three steamers, with 167 passengers and 485 crew, were inspected and their temperatures taken.

Season of 1909 (April 1 to June 30). Eighteen steamships, with 336 crew and 68 passengers, were inspected and their temperatures taken, and for this period there were no quarantinable diseases reported.

At present there are no fixed regulations pertaining to maritime quarantine at Bluefields or elsewhere on the coast of Nicaragua, nor have any fixed rules existed during the past five years.

The port physicians board and inspect the personnel and passengers of all fruit steamers coming from the United States. This inspection is compulsory and has been insisted upon by the local governors, past and present.

It has been stated that should an infected vessel arrive it would be sent to sea, there being no quarantine facilities in the port.

CEIBA, HONDURAS.

Acting Asst. Surg. Allen J. Jumel reports as follows:

Season of 1908 (July 1 to October 31). Seventy-four vessels, with 1,727 crew and 53 passengers, were inspected. Twenty-three vessels were fumigated.

Season of 1909 (April 1 to June 30). Fifty-five steamers, with 1,233 crew and 86 passengers were inspected. Seven sailing vessels, with 42 crew, were inspected. Health conditions during this period remained satisfactory.

In compliance with bureau instructions to this effect, Acting Assistant Surgeon Jumel made a report upon the maritime and sanitary advances at Ceiba, Honduras, during the past three years, and from this report the following facts are of interest:

The local maritime quarantine at Ceiba, Honduras, is under the immediate supervision of Dr. Emilio Reina, a competent graduate of the Guatemala School of Medicine, who is assisted in his work by the commandante's secretary and an officer detailed from the local aduana.

In general all vessels are boarded during the daytime and are not officially entered until released by the port physician. No actual inspection of the crews and passengers is made, but the vessel's certificates and other official papers are closely examined as to number and personnel of both crews and passengers. On steamers the captain's verbal report is courteously accepted as to the general health conditions prevailing on board. This, however, is not the case when smaller vessels from neighboring republics are boarded. These vessels are subjected to an actual inspection, which, although cursory in character, is sufficient to meet local requirements. Small vessels ar-

living with bad bills of health are not permitted to enter, and a similar regulation prohibits the entry of all infected vessels. This is not an unreasonable rule, in view of the fact that no provision has been made for the local care, isolation, and detention of persons suffering with quarantinable disease, although excellent facilities exist where an isolation hospital could be readily established. Local quarantine laws are practically good, but their application depends upon the sense of duty and integrity of the medical officer of the port.

Local sanitary advances were given their initial impetus by the visit to this port in 1907 of Acting Asst. Surg. John N. Thomas, who directed the resident service officer to insist upon such sanitary measures as were then considered to be essential. The sanitary advances effected by the service officer in 1907 were further augmented by the submission in 1908, by verbal request of the alcalde, of a brief synopsis of such sanitary improvements as were then urgently needed. All suggestions offered by the service officer in 1908 for local sanitary advancement were practical and easy of application, and the majority of them were acted upon by the municipal officers. The intelligent acceptance of suggestions for local improvement may be justly considered as an early sanitary advance, for without the intelligent application of new ideas no sanitary progress could have been effected.

The most prominent sanitary advance made in Ceiba during the past three years was the official acknowledgment of the mosquito theory, and the measures adopted for mosquito destruction during the summer of 1907. All large water containers were ordered effectually screened, water barrels and other receptacles capable of breeding or becoming the breeding places of mosquitoes were destroyed, and existing defects in local drainage were remedied with a view to the prevention of surface-pool formation. By request of the service officer during the quarantine season of 1908, frequent inspections to maintain these improvements were regularly practiced until the revolutionary attack on Ceiba in July of the same year, after which all sanitary matters were neglected. This neglect continued until June, 1909, when upon the appointment of a new commandante, activity along sanitary lines was efficiently resumed. The destruction of small water containers left the poorer inhabitants without an adequate water supply, and to remedy this evil artesian wells were driven. These wells were then and are now situated in close proximity to numerous old-fashioned water closets, and they eventually became contaminated, so that in time what was originally intended as a sanitary improvement became a menace to the general health. In 1909 amœbic dysentery made its appearance and is still present.

Road construction, the building of concrete sidewalks with appropriate culverts and drains, and the grading of old thoroughfares, started during 1907, have been added to from time to time, so that at present the business section of Ceiba presents a cleanly appearance and the drainage, although not perfect, is very good.

During the year 1908, the local board of health began the important work of cutting the grass in the streets and on the sidewalks, and the pruning of dense shrubbery twice monthly. They also ordered the removal of all old tin cans and empty bottles from yards and beneath all houses. This was discontinued in July, 1908, on account of the revolution, but was resumed in June, 1909, and is now an active feature of the local scheme for sanitary advancement.

The daily removal of garbage from the city limits was begun in 1907 in a haphazard manner; in 1908 the removal of garbage was done in a systematic manner, and from July, 1908, to June, 1909, it was allowed to remain on the streets and sidewalks indefinitely, so that it became a menace to the public health. Since June, 1909, all garbage has been regularly removed from the city limits daily.

The oiling of cesspools with crude oil, which was begun in 1907, has continued in a desultory fashion up to the present time. Insufficient oil is used for this purpose, as a rule. However, since June, 1909, the authorities have been more liberal in the quantity of oil used and in their attention given this important work. In August, 1908, all cesspools were ordered deepened to a uniform depth of 7 feet, and this did much toward contaminating the well-water supply.

In 1907 the municipality permitted the local fruit companies to build conjointly a hospital for the care, isolation, and detention of sick sailors.

The prompt recognition of the necessity for public vaccination to prevent smallpox infection during the early part of the year 1909 may be mentioned as an educational advance in local sanitary requirements. Formerly it was the custom to wait until the port became infected before resorting to needed prophylactic measures.

One of the most important sanitary advances made during the last three years is the maintenance of all improvements by frequent municipal inspection. The present governor of Ceiba, the Hon. M. Rivas, has done much toward improving the sanitation of the port.

Formerly it was the custom for residents and local officials to deride resident service officers whenever yellow fever infection visited the port, but in 1908 their attitude changed, and official orders for a house-to-house inspection were issued, to determine the existence of further cases.

LIVINGSTON AND PUERTO BARRIOS, GUATEMALA.

Acting Asst. Surg. L. A. Wailes reports as follows:

Season of 1908 (July 1 to October 31). One hundred vessels, with a total of 636 passengers, were inspected.

Acting Asst. Surg. R. P. Ames reports as follows:

Season of 1909 (April 1 to June 30). Thirty-four vessels, with 1,161 crew and 762 passengers, were inspected.

Since the completion of the dock of the Guatemala Railway at Puerto Barrios all traffic has been removed from Livingston to that port. Puerto Barrios is the only port in Guatemala on the Atlantic side, whence ships clear and passengers embark for United States ports.

On passengers coming from the interior, the medical examinations are made at Guatemala City by Dr. Juan Padilla, a prominent and well-known physician, and for this examination a small fee is charged. Passengers holding certificates from Doctor Padilla must make a direct trip from Guatemala to Barrios in order to obtain the personal passenger certificate, issued by the service officer; otherwise passengers would be subject to a stay of three days, under observation, as required by regulations, at Barrios.

Vessels bound for the Gulf ports of the United States carry in addition to the consular bill of health and special certificate a record of temperature variations. The papers issued contain the names of all persons on board, an entry of the temperature of each passenger being placed opposite each name, together with the hour when taken. The inspections are made on lines similar to those in vogue at the United States quarantine stations.

Livingston.—Situated on a high bluff at the mouth of the Rio Dulce. Population estimated at 2,400. The drainage is natural. The water supply is derived from rain water stored in tanks and various receptacles, all unscreened. *Stegomyia calopus* are present. Yellow fever has been present at Livingston at various times, the last epidemic having occurred in 1905. Vessels anchor in the open sea about 1 mile from shore. No passengers embark from the port. Ships get their final clearance from Barrios, some 15 miles across the bay.

Puerto Barrios.—A small swampy town or settlement situated on the Gulf of Amatique. Terminus of the Guatemala Railway. Population estimated at 350, consisting mostly of the office force and colored laborers in the employ of the United Fruit Company and railway. These laborers have either resided in Puerto Barrios or at other places in the hot belt on the coast, which probably accounts for Barrios having escaped the yellow fever epidemic of 1905.

Water supply: Piped from a well about a half mile away; quality good, but quantity inadequate. The rain water is stored in cisterns and other receptacles, only a few of which are properly screened. *Stegomyia calopus* are present, mostly in the central part of the town. Recurrent cases of malaria and dysentery are the prevailing diseases. Early in March Passed Asst. Surg. R. H. von Ezdorf made inspections covering Barrios, the fincas of the United Fruit Company at Virginia, the adjacent points on the line of the railway and Zacapa. Certain recommendations were made by him which have been partly carried out. Vessels discharge and load cargo at the railway dock at Barrios day and night. The dock projects into the bay 1,083 feet, is made of heavy creosoted timber, and is mosquito proof.

Virginia farms.—These farms are the property of the United Fruit Company. They extend from a point about 20 miles from Barrios along the line of the railway in the direction of Guatemala City for a distance of about thirty-odd miles. The population is about 4,000, including women and children. Malaria and dysentery are the prevailing diseases throughout the farms. A small modern and well-equipped hospital has been erected at a central location.

Early in the year a few cases of smallpox occurred. The sick were isolated. The buildings used were destroyed by fire. Contacts were quarantined and everyone vaccinated. The disease was promptly checked.

Zacapa.—This town is 102 miles distant from Barrios. The water supply is piped from a distance and is stored in various unscreened receptacles about the houses. The *Stegomyia calopus* is present. This town was visited by an epidemic of yellow fever in 1905.

PORT LIMON, COSTA RICA.

Acting Asst. Surg. D. W. Goodman reports as follows:

Season of 1908 (July 1 to October 31). One hundred and nine steamers, with 6,140 crew and 3,578 passengers, were inspected and temperatures of crew and passengers taken.

There has been no evidence of any case even suspicious of yellow fever during the season either in Port Limon or vicinity.

At the request of the quarantine authorities on the Isthmus of Panama 30 bills of health for ships leaving this port for Panamanian ports have been viséed, and 287 certificates were issued to residents of San Jose, Cartago, or Limon bound for Colon.

Season of 1909 (April 1 to June 30). Ninety-seven steamships, with 5,492 crew and 1,427 transit and 1,205 direct passengers, have been inspected. Of these steamers, 52 were fruit vessels bound for ports in the United States south of the southern boundary of Maryland, and were made to conform to the special quarantine regulations provided for vessels from the fruit ports. No quarantinable diseases were reported during this period.

Doctor Goodman also reports that the sanitary conditions of the port have been good for the past two years. The policing of the streets and the removal of garbage are duties now performed by an organized sanitary squad.

For several years the quarantine officers of the Canal Zone, satisfied of the freedom from yellow fever of Port Limon and San Jose, but being suspicious of the towns in the interior of Costa Rica, have required all passengers embarking for Colon to bring certificates from the medical officer of the Public Health and Marine-Hospital Service stationed at Port Limon to the effect that they had remained under observation five days in Port Limon or San Jose. In May of this year this requirement was withdrawn. Passengers from La Guaira and Caracas are quarantined upon arrival at Port Limon by the local authorities to complete five days from those ports.

Acting Asst. Surg. William H. Harris, who relieved Acting Asst. Surg. Goodman on August 10, 1909, the latter being obliged to resign his position on account of ill health, reports as follows on the sanitary advances in the Republic of Costa Rica during the past three years:

At Port Limon very radical sanitary changes occurred about ten years ago, and transformed the port completely. The water supply was changed four years ago from the Puta River to the Banana River. The water is pure and is piped a distance of 10 miles.

The sewage system constructed ten years ago has been connected to 1,200 additional dwellings in the past four years. There are remaining only about 50 houses with ground closets, and these will soon be forced to make sewer connections or pay a fine. A large reservoir of 50 cubic meters capacity has been erected to add additional water supply for flushing purposes. This rendered it possible for dwellings previously inaccessible to the sewer system to be connected with it. Six thousand feet of sewer pipe have been laid for these additional connections and submains along the various streets.

Within the city limits 5,700 square feet of swampy districts have been filled in. Drains have been cut in adjacent swamps, which now render this ground practically dry. These improvements, together with the fact that care is taken by the local authorities to remove all receptacles capable of collecting water, or to use petroleum where necessary, has diminished greatly the number of mosquitoes present. There are strikingly few mosquitoes to be found, but in their number there are some of the *Anopheles* and *Stegomyia* species.

One criticism concerning the sewage disposal must be made. The outlet pipes into the Caribbean Sea open upon a shelf or table of coral rock where the water is quite shallow, and at certain times of the tide the rock is almost dry. An extension of these pipes for a distance of about 150 yards would convey the sewage into a good current and into deep water.

MARITIME QUARANTINE IN COSTA RICA.

Maritime quarantine interests are focused on two ports, Limon on the eastern or Atlantic coast and Punta Arenas on the western or Pacific coast.

A statement concerning the quarantine of the local government for Port Limon will be equally applicable to Punta Arenas, as the two have identical regulations.

The diseases quarantined against are bubonic plague, yellow fever, smallpox, and cholera. Other diseases, such as scarlet fever and whooping cough, are also quarantined when actually occurring on board of vessels.

Trachoma cases are not rejected, although it is reported that there is much of it in Costa Rica.

There have been no epidemics of any disease in the Costa Rican ports during the last three years.

Yellow fever, at one time endemic, has only appeared in the past five years in the form of two sporadic cases.

There has been a change in regard to the period of time of quarantine for this disease from five to ten days. This change was based upon the last epidemic at St. Nazarre, propagated from a case imported from Martinique which developed ten days after departure.

Persons landing at Port Limon must have been successfully vaccinated within the past three years or must submit themselves to vaccination before landing.

PUERTO CORTEZ, HONDURAS.

Acting Asst. Surg. R. P. Ames reports as follows:

Season of 1908 (July 1 to October 31). One hundred and twenty-five vessels, with 2,974 crew and 229 passengers, were inspected and temperatures taken.

Acting Asst. Surg. L. A. Wailes reports as follows:

Season of 1909 (April 1 to June 30). Sixty-two vessels, with 98 passengers, were inspected and temperatures taken. Health conditions at this port during this period were fair.

TELA, HONDURAS.

Acting Asst. Surg. C. K. Roe reports as follows:

Season of 1908 (July 1 to October 31). Twenty-five steamers, with 782 crew, were inspected and temperatures taken.

Season of 1909 (April 1 to June 30). Thirty-one vessels, with 587 crew, were inspected. Health conditions during these periods were reported satisfactory. Doctor Roe praises the health authorities for their willingness to carry out the suggestions made by him for the improvement of sanitary conditions. He states that the town of Tela will compare favorably with the majority of places of a similar size in the United States.

INSPECTION AT OTHER FOREIGN PORTS.

In addition to the medical officers detailed to the several fruit ports above mentioned, officers were also detailed to the offices of United States consuls, in accordance with the act of Congress approved February 15, 1893, in the following-named ports, for the purpose of enforcing the Treasury regulations provided for such ports, and signing the bills of health in conjunction with the consuls.

At certain of the ports, viz, Bridgetown, Castries, La Guaira, and St. Thomas, officers were detailed not only to certify as to the health conditions of vessels leaving these ports for the United States, but also to perform the necessary disinfection of said vessels when their original port of departure was an infected or suspected port. By fumigating said vessels, either for the destruction of mosquitoes or the destruction of rats, and giving a certificate with regard to such disinfection, the time consumed by the passage of the vessel from the above-named ports to the quarantine stations in the United States was accredited to the vessel as a deduction from the time which might otherwise be demanded for detention at the United States quarantine station.

At a number of the other ports named below, particularly those in China and Japan and Naples, the officers, in addition to their quarantine inspection, made inspection of immigrants with reference to contagious or infectious diseases which might debar them from admission on arrival in the United States. These inspections were made in accordance with requests from the immigration service and the steamship companies, the officers exercising no positive right of exclusion, but informing the steamship companies and others of those who would be subject to rejection at the port of arrival under the immigration regulations.

Following are extracts from the reports made to the bureau by the officers stationed at the ports named:

HABANA, CUBA.

The following is an extract from the report of Passed Asst. Surg. J. W. Ames for the fiscal year ending June 30, 1909:

The sanitary history of this period in Cuba was signalized by the final extinction of yellow fever throughout the Republic and the

transfer of the health department from American to Cuban authority at the close of the second intervention, January 28, 1909.

The year opened inauspiciously. After an apparent freedom from epidemic fever and the appearance of but three cases at Santiago de Cuba in three months, the disease was found July 8 to exist at the mining camp of Daiquiri, a few miles from that city.

An expert sent by the national sanitary department reported 10 convalescent cases of yellow fever, which had been diagnosed by the local health officer as malaria, and expressed the opinion that the disease had been continuously present in Daiquiri for at least three months. Twenty cases were subsequently reported from this camp, but the epidemic was effectually eradicated by August 1.

This outbreak alone fully justified the close surveillance of passenger traffic begun by the service on April 6, 1908. The subsequent introduction of yellow fever (July 5) into San Juan, P. R., by the Cuban steamer *Julia*, sailing out of Santiago de Cuba, supplied additional evidence of the need of such restrictive measures.

The fortunate interception of this case from the Daiquiri mines by Acting Asst. Surg. P. del Valle, Public Health and Marine-Hospital Service, at San Juan, forestalled a possible epidemic among the non-immunes of Porto Rico.

On August 22, a further focus was found at Firmeza, near Santiago, and, August 27, one at Antilla, a town on the north coast. On September 7 a case was discovered in the city of Habana, which had remained free of infection from January 31, 1908. The patient was a Spanish boy about 20 years of age, without occupation, and living at a very insanitary lodging house near the passenger landing, known as the "Machina." The history of the case showed that he passed the first four days of his illness without medical care, finally entering Las Animas Hospital on September 11, where he died five days later. The clinical course and necropsy findings were characteristic.

Investigation showed that this nonimmune had resided in Habana continuously for at least a year, and furnished conclusive evidence that one or more cases of yellow fever had gone unrecognized—had infected various *Stegomyia*, which later inoculated the above patient.

The infection could not be satisfactorily traced, but it is probable it was brought from Daiquiri. The sanitary department was fully alive to the situation, and proceeded with commendable activity. All nonimmunes within a radius of six blocks were registered and examined twice a day for six days; several hundred vagrants from the water front were rounded up by the police and sent to Tricornia quarantine for a similar period, while all buildings in the suspected area were thoroughly fumigated with sulphur. Through this vigilance the invasion was confined to one case and the quarantine imposed by the United States against Habana was raised after eighteen days.

Later, in December, two further cases of yellow fever were reported from the town of San Luis, in Oriente Province, both patients entering the Civil Hospital at Santiago, where one died on December 31, and the other was discharged, recovered, January 13, 1909. The original focus in this invasion also baffled the diligent search made by American sanitarians through Oriente Province.

From this outbreak to the close of the fiscal year no other cases have been reported, and the disease may fairly be considered exterminated, in view of continued hot weather, with great humidity, and the known influence these factors have in the development of latent foci.

History of the epidemic 1905-1909.

A review of this last visitation of yellow fever furnishes an interesting study for sanitarians. Its origin has thus far defied detection and it is very probable will never be known. Some authorities believe infection was carried by a mild case from New Orleans, where the disease existed in 1905 in epidemic form. Others think it was conveyed from Veracruz.

At any rate, its progress in Habana was so insidious that by October 17, 1905, when the first case was officially reported, it was evident that yellow fever had been present for some weeks.

Invasions during this period were either unattended medically or wrongly diagnosed, as is usual with epidemics of this disease everywhere.

Once announced and a medical dragnet installed by the sanitary department, cases were reported from various quarters of the city, 41 being treated in November and 26 in December.

The following table summarizes statistics for the entire period.

It will be noted that the epidemic was suppressed in this city after three months, the cool weather of the winter season aiding materially in reducing the number of *Stegomyia*. In the fall of 1906, it was again introduced and 61 persons were infected, 8 fatally.

In the rural districts, however, where ambulant cases conveyed the infection sometimes great distances, it resisted the most determined efforts of the authorities for three years. In 1906 its stronghold was in Matanzas Province, in 1907 in Santa Clara Province, and in 1908 in Oriente, where it was finally exterminated.

The mortality rate of 32½ per cent registered in this epidemic must not be interpreted as an indication of special virulence.

In the provinces numerous mild cases of fever were unquestionably not reported to the health officer and grave cases only being recorded, the death rate was correspondingly raised. In addition, atypical cases carelessly studied or not studied at all by rural practitioners, with whom a positive diagnosis rests solely on the phenomenon of black vomit, aided in the perpetuation of the disease.

Dr. M. G. Lebrede, subdirector of Las Animas Hospital, and a recognized authority on yellow fever, has frequently expressed the opinion that in this climate, where sudden weather changes are uncommon, and among Spanish laborers whose habits are remarkably abstemious, yellow fever does not result fatally in more than 10 per cent of the cases.

Anything in excess of this indicates hidden infection.

In view of the fact that the last epidemic at Laredo, Tex., had a mortality of 10 per cent, and the 1905 invasion of Louisiana and Mississippi a rate almost as low, we may fairly assume that instead of 403 cases there were actually about 1,200 cases in Cuba since 1905.

REVIEW OF YELLOW FEVER EPIDEMIC IN CUBA, 1905 TO 1909.

	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
City of Habana:																								
1905.....																			3	2	41	11	26	11
1906.....	5	2	1	0							4	1			4	1	7	2	24	3	23	2	3	0
1907.....															1	0	2	0	3	1			1	0
1908.....	2	0															1	1						
Habana Province:																								
1905.....																					1	0		
1906.....																	2	1	4	2	1	2	1	0
1907.....					1	0			3	1	2	0	1	0	4	1	8	4	12	6	5	1	1	1
1908.....	2	1																						
Matanzas:																							5	0
1905.....																								
1906.....	1	0	0	1	1	0	1	0	2	1			1	0	2	1	1	1			3	3		
1907.....									2	0	1	0	4	1	6	2	4	3	5	2	4	4		
1908.....																								
Santa Clara:																								
1905.....																	1	1	8	5	9	4	1	0
1906.....																								
1907.....															35	9	31	7	8	3	14	4	5	4
1908.....	7	4	6	1																				
Camaguey:																								
1905.....																								
1906.....																								
1907.....																			1	1	2	1		
1908.....																								
Oriente:																								
1905.....																								
1906.....																								
1907.....																							1	1
1908.....	2	1	1	0			1	1	1	0	3	1	20	3	2	1	0	1					2	1

Summary.

	Total—		Death rate.
	Cases.	Deaths.	
1905.....	76	24	<i>Per cent.</i> 31.57
1906.....	110	33	30
1907.....	167	58	34.72
1908.....	50	15	30
Grand total.....	403	130	32.25

Measures to prevent the introduction of yellow fever into the United States, fiscal year 1909.

To guard against both the known and unknown foci in the rural districts and yet effect no hardship to the city of Habana, which remained free of fever until September, 1908, was a sanitary problem of moment.

The solution made at the opening of the close quarantine season in April, 1908, wherein Habana and suburban towns were named as detention centers for passengers about to embark for southern ports, proved fairly safe and was continued throughout the heated term.

On arrival from the suspected country localities prospective passengers were registered at the office of the service and required to report twice daily thereafter for six days. The necessity for frequent inspection was occasioned by the ease with which quite distant points can be reached from Habana and return be effected the same day.

At the conclusion of the detention period passengers free of quarantinable disease were given certificates which admitted them to southern ports.

Persons bound for New York were allowed to proceed without delay, those en route for points north of the southern boundary of Maryland carrying certificates from this office to that effect. The quarantine officer at New York was thus able to clear vessels promptly and to ascertain readily what portion of the personnel was bound for points in infectible territory.

As rapidly as sanitary conditions in the interior returned to normal, quarantine from the districts involved was removed.

On August 5 it was lifted from the provinces of Habana, Matanzas, Pinar del Rio, and the Isle of Pines.

On September 10 restrictions were withdrawn from the provinces of Santa Clara and Camaguey, leaving only Oriente under surveillance. It was finally removed from this province on October 20.

Cuban quarantine against Mexico.

To guard against the reintroduction of yellow fever from Mexican ports, rigid quarantine has been maintained by the Republic since September, 1908. The sanitary department was thus able to intercept cases as follows: From Merida, September 28, per steamer *Merida*, a fatal case in the person of an American citizen. On October 19 a second case was apprehended on the steamer *Monterey*, from Veracruz, and another on June 18, also from Veracruz, the latter case appearing more than four months after yellow fever was said to be exterminated.

The quarantine also twice developed the presence of smallpox on vessels en route from Veracruz during this period.

All nonimmune passengers from these ports are detained for six days at Tricornia quarantine, on the north shore of Habana Harbor. Those showing a rise of temperature are immediately transferred in screened launch and ambulance to Las Animas Hospital.

Tuberculosis in Cuba.

Relieved again of its ancient and most calamitous plague, Cuba has turned her attention toward the control of an endemic affection which exacts an annual tribute in human life as appalling as it is unnecessary. Tuberculosis answers for 1 death in 5, and its management constitutes the most important hygienic problem presented to the sanitary department.

An antituberculosis campaign was carefully planned during the closing months of the provisional government, which is being faithfully carried out by the new administration.

A modern sanatorium for incipient cases has been established at Arroyo Naranjo, a particularly salubrious point near this city, and in Habana a free dispensary is conducted, to which is attached a

corps of visiting nurses under the direction of trained supervisors, from the United States.

Popular education, as well as immediate relief, is aimed at.

The result of six months' effort is already apparent in the death rate, and the outlook for a very considerable amelioration of conditions is bright.

Operations of the service.

Aside from the general surveillance of ships and their personnel, the following transactions were reported in the weekly summaries during the fiscal year:

Bills of health issued.....	1,113
Vessels inspected.....	891
Passengers inspected.....	43,539
Members of crew inspected.....	52,562
Vessels fumigated.....	83
Immune certificates for Canal Zone.....	270
Health certificates issued.....	8,000

In addition, medical treatment was furnished to 31 seamen ill aboard American vessels, and the medical officer in command served as United States pension examiner for the district embraced by the local consulate.

Special inspections were made during the year at Nuevitas and Caibarien, Cuba.

Mortality report of Habana.

The following represents the number of deaths monthly in this city for the fiscal year:

Month.	Deaths.	Month.	Deaths.
1908.		1909.	
July.....	528	January.....	506
August.....	519	February.....	529
September.....	457	March.....	534
October.....	515	April.....	498
November.....	437	May.....	568
December.....	487	June.....	537
		Total deaths.....	6,115

Population of Habana, 315,000; mortality rate, 19.39 per 1,000.

Service personnel.—At the beginning of the fiscal year there were on duty at Habana, Cuba, Passed Asst. Surg. J. W. Amessee, in command, Acting Asst. Surg. Pedro Villoldo, and R. M. Colmore, and three attendants.

The only changes made during the year were the discontinuance of Doctor Colmore's services at the close of the quarantine season, the appointment of Acting Asst. Surg. Charles A. Noiret as traveling sanitary inspector on June 7, 1909, and the substitution of Attendant T. Ruesga for L. Villegas, resigned.

CIENFUEGOS, CUBA.

The following is from the report of Acting Asst. Surg. J. R. Suarez. During the months of July, August, and for the first fifteen days of September this station was in charge of Acting Asst. Surg.

P. Villoldo, who was sent from Habana on account of the serious illness of Acting Asst. Surg. C. J. Marsillan.

STATEMENT OF INSPECTION SERVICE AND FUMIGATION OF VESSELS.

Month.	Vessels inspected.	Vessels inspected and fumigated.	Bills of health issued.	Crews—		Passengers.
				In-spected.	Landed.	
1908.						
July.....	10	9	10	170	1	6
August.....	9	7	12	340	0	0
September.....	10	9	13	380	0	14
October.....	12	8	12	374	1	0
November.....	17	1	17	566	1	0
December.....	14	0	14	426	3	5
1909.						
January.....	19	0	19	484	0	0
February.....	19	0	19	720	0	0
March.....	26	0	26	748	0	28
April.....	25	0	25	717	0	6
May.....	14	0	14	431	0	0
June.....	19	0	19	527	0	0
Total.....	196	34	200	5,883	6	59

All vessels destined for ports in the United States south of the southern boundary of Maryland, until November 21, 1908, were fumigated for the purpose of killing mosquitoes. This fumigation was done just prior to the departure of the vessel, the vessel being placed in the open bay, away from the wharves, to prevent a reintroduction of mosquitoes.

During the dry season the city has been free from mosquitoes, but since the rainy season has begun these insects have appeared in many parts of the city. The local health authorities have begun the systematic oiling of all possible breeding places. The sanitary condition of the city has been satisfactory on the whole.

MATANZAS, CUBA.

Acting Asst. Surg. E. F. Nunez reports as follows:

No yellow fever has been reported either in the city or in the Province during the fiscal year ended June 30, 1909, nor has any vessel arrived with a quarantinable disease on board during the said period. Prior to November 10, 1908, while yellow fever still prevailed elsewhere in the island, all vessels leaving for ports south of the southern boundary of Maryland were fumigated, and crews and passengers inspected and certified in accordance with the service regulations. Since then, in view of the improved conditions existing, quarantine restrictions have been abolished against outgoing vessels and their personnel originating from any Cuban port; this in compliance with directions from the bureau.

In those cases where a vessel arrived from an infected port without having been fumigated by an officer of the service at the port of departure, this operation was performed whenever such a vessel left Matanzas for the United States direct, particularly for its southern ports.

The Cuban quarantine service at Matanzas has been conducted with efficiency during the year, the same officer, Dr. Felix Garcia, being in charge since the withdrawal of the first American intervention, in 1902.

Dr. Juan Guitéras, well known as a sanitarian and yellow-fever expert, formerly of the service, was promoted during the year to the position of director of sanitation for Cuba.

During the year 213 bills of health were issued for United States ports, 5,884 members of crew and 679 passengers inspected and passed, 18 vessels fumigated and certified, and 17 health and acclimation certificates issued to passengers bound for the United States, mostly by way of Habana. There were no transactions during this period either for the Canal Zone or for the Republic of Panama.

SANTIAGO DE CUBA.

Acting Asst. Surg. Richard Wilson, on duty at this port, reports in part as follows for the fiscal year 1909:

Bills of health were issued to 269 vessels bound for the United States and its dependencies; 163 vessels were inspected and 21 fumigated. On these vessels there were 10,924 crew and 5,878 passengers.

The number of certificates of immunity to yellow fever issued during the year was 35. Twenty-one vessels were fumigated to destroy mosquitoes.

VERACRUZ, MEXICO.

Acting Asst. Surg. C. S. Carter reports the following transactions: Bills of health issued, 76; sailing vessels inspected, 3; steam vessels inspected, 24; sailing vessels fumigated, 3; steam vessels fumigated, 46; passengers inspected, sailing vessels, 2; passengers inspected, steam vessels, 1,833; number of crew inspected, sailing vessels, 47; number of crew inspected, steam vessels, 3,300; total number passengers and crews, 5,182; number of crew removed on account of sickness, 3.

During the period from November 1, 1908, to February 13, 1909, there were 13 cases of yellow fever with 6 deaths. Since February 13 no cases of yellow fever have been reported. One case of yellow fever was reported as having been removed from the passenger steamer *Fuerst Bismarck* at Habana, which vessel sailed from Veracruz on June 16 last, after having been at Puerto, Mexico, and Tampico, taking on passengers at both places. The patient came from Puebla and registered at the Hotel Buena Vista, at Veracruz, where he remained for six days before embarking on said steamer. The reports of the inspector of the superior board of health of Veracruz show that there has been no sickness in the hotel during the last two years, and that the man had been in good health while he stayed there. There have been no other cases of sickness, either before or after this man left the hotel, nor in any of the buildings in the same block; nor, in fact, in any of the adjoining blocks. Although the entire water front was diligently searched and every means exhausted by the local sanitary authorities to locate the source of the infection, nothing definite relative thereto was ever determined.

Smallpox was reported prevalent throughout the country surrounding the city of Veracruz.

While the city of Veracruz was believed to be reasonably safe so far as yellow fever was concerned, there was always some doubt as to the freedom of certain localities in the country surrounding from mild or unrecognized cases of this disease; therefore temperatures were taken of all passengers and crews going to southern ports in the United States, also of intermediate and steerage passengers going north by the Ward Line steamers.

During the months of April and May, although the death rate was high, it compared favorably with that of the preceding two years, and for June the death rate was the lowest for the last ten years, being only 117. Tuberculosis was the cause of most of the deaths during the last three months of the year.

The antimosquito work was carried on during the last three months of the fiscal year with fair regularity. A house-to-house inspection was inaugurated, and the removal of any fever cases to the hospital for observation and the isolation of all contagious diseases was the rule. All cases of sickness reported by the inspectors were investigated. Houses wherein sickness occurred were fumigated, and mosquito breeding places were either obliterated or treated with petroleum.

The inspection of the city was carried out in the following manner: The city was divided into districts, with each district under the supervision of a medical inspector. Under him a chief inspector or foreman was placed in charge of a squad of men. The chief inspector was directly responsible to the physician in charge for the condition of the district. This squad was composed of oilers, ditchers, and disinfectors. If an inmate of a house was reported sick, he was at once reported to the physician in charge of the district, who immediately visited the patient. If a case of fever was discovered, and the temperature was above 100° F., the patient was removed to the observation ward either at the hospital of San Sebastian, the Woman's Hospital, or the Hospital de Salubridad. The observation wards in these hospitals are very comfortable, and are thoroughly screened and clean. Each house in every district is inspected at least three times a week as a routine measure, and, if necessary, every day. Each inmate of a building must be seen or accounted for by the inspector, and his book must tally exactly with that of the inspector of the preceding day, and the "patios" (back yards) must be free and clean of all trash. In the tenement-house district, known as the washerwoman's district, all water, trash, and other waste matter is removed. All such refuse is hauled out of the city, loaded upon barges and towed out to sea. Owing to the very dry season, the city water supply has been hardly adequate to the needs of the people, causing special trouble with water-closet connections.

Owing to the hot, dry season (only two heavy rains in about eight months) there were very few mosquitoes in Veracruz. After a diligent search of the vessels that cleared from Veracruz for United States ports, mosquitoes were found on but three. These vessels discharged cargo alongside of what is known as the railroad pier, and the mosquitoes were of the *Culex* variety. Very few *Stegomyia* were observed in the city.

There are very few screened houses in Veracruz at present, but screens for beds, or mosquito bars, are generally used. It would be almost impossible to enforce the regulation compelling the screening

of houses on account of there being so many people who are not financially able to purchase the required material.

There has been very little sickness reported aboard vessels while in the harbor at Veracruz. One case was removed from the steamship *Merida*, and two from the steamship *City of Mexico*; all three were malaria—one of them of the hamaturic variety. This small amount of sickness on vessels in the harbor was attributed to the fact that every morning all crews were required to report to the steward, and in the event of illness of a member of the crew the doctor employed by the ship was immediately notified. Where the illness was of a serious nature the doctor removed the patent from the ship until he had recovered.

Cuba maintains a six-day quarantine against Veracruz, and has a medical officer stationed there who inspects and fumigates vessels for Cuban ports.

SALINA CRUZ, MEXICO.

Acting Asst. Surg. Alfredo E. Gochicoa reports as follows:

For the fiscal year ended June 30, 1909, 39 vessels bound for ports in the United States and its insular possessions were inspected and fumigated. The fumigation of vessels leaving Salina Cruz for ports in Hawaii is regularly performed for the destruction of mosquitoes. A great many vessels ply between Honolulu and Salina Cruz, bringing sugar and taking away general cargo. The general cargo comes via Coatzacoalcos and the National Tehauntepec Railway. This railway passes through several places on the Isthmus of Tehauntepec in which yellow fever is liable to be present either in a mild form or in a form escaping observation. The peons or laborers who handle this cargo at Salina Cruz are drawn for the most part from the interior of the isthmus, and they have in the past been the supposed means of bringing yellow fever into Salina Cruz. The infection of *Stegomyia* in Salina Cruz from any source would constitute an easy means of infection for Hawaii, in which Territory mosquitoes of the variety above mentioned abound. A vessel from which a cargo of sugar has just been removed would naturally attract many mosquitoes, and that this is the case an inspection of conditions at Salina Cruz has shown. So in order to remove the possibility of transporting an infected mosquito to Hawaii, which as a whole is extremely vulnerable to yellow-fever infection, every vessel leaving Salina Cruz for that place is fumigated. The sanitary condition of the port has been excellent throughout the year.

COATZACOALCOS, MEXICO.

Acting Asst. Surg. W. R. P. Thompson reports as follows:

During the fiscal year ended June 30, 1909, 76 vessels, with a total of 4,779 crew and 156 passengers, were inspected. Fourteen vessels were fumigated for the purpose of destroying rats and mosquitoes. This port, owing to the drainage or reclamation of marsh lands during the past three or four years, together with the installation of a new sewerage and water system, has become very much improved from a general sanitary standpoint. The port, however, as in the case of Salina Cruz, is always subject to infection from yellow fever from

the small settlements or towns in the interior of the Isthmus of Tehauntepec.

PROGRESO, MEXICO.

Acting Asst. Surg. J. F. Harrison reports as follows:

Season of 1908 (July 1 to October 31, 1908). Twelve vessels were spoken and passed, 62 steamers were inspected and passed, 28 steamers were disinfected and passed, 3 sailing vessels inspected and passed, and 3 sailing vessels were disinfected; 3,351 crew and 523 passengers were inspected.

Season of 1909 (April 1 to June 30, 1909). Nineteen vessels were inspected and fumigated, and a total of 226 passengers and crew inspected.

In compliance with a general order issued to the service officers stationed at the Mexican and Central American Gulf ports to report upon the sanitary advances made in the last three years at said ports, Acting Assistant Surgeon Harrison states that few, if any, changes have occurred at Progreso even in the past six years.

Maritime quarantine at Progreso is under the direction of a medical officer appointed by the superior board of health of Mexico. All vessels arriving or departing must be "passed" before being granted "entry" or "clearance." All arriving vessels are detained at a safe distance from shore until inspected and passed. If found infected, they are disinfected and subjected to further detention, all quarantinable cases having been removed to the lazaretto ashore. Outgoing passengers are all examined before being permitted to board outbound vessels.

TAMPICO, MEXICO.

Acting Asst. Surg. Le Roy Stowe reports as follows:

Season of 1909 (April 1 to June 30, 1909). Fifty-nine vessels were inspected and passed, 1,798 crew and 124 passengers inspected, and 11 vessels fumigated. No cases of quarantinable disease occurred during this period.

During the past year a new quarantine station has been completed at the port of Tampico. This building is situated on the north bank of the river, just within the harbor entrance. The station has not been equipped with a wharf. There is one hospital ward with a capacity of 8 beds.

Thus far there have been no cases of contagious diseases removed from vessels to the station.

In the city of Tampico proper, which is situated 6 miles from the mouth of the Panuco River, a well-equipped city hospital is maintained. This building now has a capacity of 100 beds, and the average number of patients treated is 80. A well-equipped bacteriological laboratory is also maintained.

There is an isolation hospital located in the suburbs of the city at a safe distance from the residences. It has a capacity of 30 beds. During the past three years this hospital has remained empty, not a single case of yellow fever or smallpox having occurred.

In the extension of the water and sewage systems and in the filling in of the low-lying areas about the city excellent work has been done during the past three years.

The following statistics covering the period June 30, 1908, to June 30, 1909, will indicate the nature and progress of this work:

Cubic meters of filling.....	231, 000
Meters of sewer piping laid.....	3, 400
Meters of water piping laid.....	5, 300

At the present rate of progress it is estimated that two more years will yet be required to complete the water and sewage systems and to fill in the low-lying areas to secure proper drainage.

An additional contract has recently been let for the paving with asphalt of the streets intersecting 100 squares of the city's area.

Tampico derives her water from a point on the Tamesi River 20 kilometers distant. It is pumped to a reservoir to settle, and is carried thence to the city. The water now furnished is clear and wholesome, typhoid fever being of rare occurrence.

Sewage is piped about 1 mile below the business center of the city and emptied into the Panuco River. Except when the tide is at flood, the strong current of the river carries this sewage promptly to sea.

Garbage is collected regularly and removed to a hillside beyond the city limits. At intervals, when sufficiently dry, much of this material is burned.

Dona Cecilia, Arbol Grande, Talleres, and La Barra are small villages along the railway between Tampico and the Gulf. As yet they have no water or sewage systems. The railroad company furnishes these districts with a limited supply of water from their private line of piping. During the summer season, however, many residents catch rain water in barrels for household use, and as these barrels are neither screened nor oiled, they furnish abundant breeding places for mosquitoes.

The area lying between Tampico and the Gulf is poorly drained, especially along the right of way of the railroad.

Pools of stagnant water are numerous, and no effort has been made thus far to drain these districts nor to oil the pools.

Tampico therefore has mosquitoes in abundance, mostly anopholes and culex. Stegomyiæ are present, but are relatively few in number.

With the onset of the rainy season in May mosquitoes make their appearance in numbers and breed uninterruptedly until the dry season sets in during the winter months.

If the further advance is made of draining the districts mentioned, and oiling such breeding places for mosquitoes as can not be drained, Tampico will be made as sanitary a port as any that can be found on the Gulf coast.

With a population of 20,000 inhabitants, the average number of deaths per month from all causes is 45.

The American population of Tampico, conservatively estimated, is about 500.

Out of this number there has been only 1 death during the past three months, this being a case of death by violence.

During the month of May, 1909, smallpox prevailed rather widely in the district adjacent to the Intercoastal Canal between Tampico and Tuxpan. At the present time the condition of this district has markedly improved and is no longer considered a menace to the health of the port.

BRIDGETOWN, BARBADOS.

Acting Asst. Surg. R. H. Urquhart reports as follows:
Season of 1908 (July 1 to October 31):

Number of bills of health issued.....	162
Number of passengers and crews examined.....	81,489
Number of vessels fumigated.....	35

Season of 1909 (February 22 to June 30):

Number of bills of health issued.....	133
Number of person examined.....	6,468
Number of vessels fumigated.....	24

The last case of yellow fever occurred in this port on March 19. The port of Bridgetown is reported to be in excellent sanitary condition.

CASTRIES, ST. LUCIA.

Acting Asst. Surg. A. J. Maylie reports as follows:

Season of 1908 (July 31 to October 31, 1908). One hundred and thirty-eight vessels were inspected and 92 fumigated. These vessels carried a total of 4,400 crew and 116 passengers. During this period the sanitary condition of the island was reported to be good.

Season of 1909 (April 6 to June 30, 1909). Thirty-five vessels were inspected and 21 fumigated. These vessels carried a total of 107 crew and 98 passengers. No quarantinable diseases prevailed during this period either in the port or in the vicinity thereof.

Fumigation of vessels for Cuban ports.

Upon the request of the Munson Line of steamships, made through the bureau, the sanitary authorities in Cuba gave their consent to waive the disinfection upon arrival at Cuban ports of the vessels of the Munson Line leaving the port of Castries, St. Lucia, when such vessels carried a certificate of disinfection from the service officer stationed at that port. Accordingly orders were issued to Acting Asst. Surg. A. G. Maylie, at Castries, St. Lucia, to fumigate and certify steamers of the Munson Line destined to Cuban ports upon the request of the captains of these vessels.

ST. THOMAS, DANISH WEST INDIES.

Acting Asst. Surg. W. F. Wild reports as follows:

Season of 1908 (July 1 to November 2). Sixty-eight vessels were inspected and 1 fumigated.

Season of 1909 (March 31 to June 30, 1909). Forty-five vessels were inspected. Good health conditions prevailed at this port during both periods.

LA GUAIRA, VENEZUELA.

On account of the existence of bubonic plague in the cities of Caracas and La Guaira, Venezuela, during and including the time between the months of March and June of 1908, and on account of the belief, based upon previous experience under similar conditions, that there would be a recrudescence of the disease this summer, the

Secretary of the Treasury addressed a letter to the Department of State setting forth the necessity from a sanitary standpoint of attaching a medical officer of the Public Health and Marine-Hospital Service to the American consulate at La Guaira for the purpose of cooperating with the consular officer in carrying out the provisions of the act of Congress approved February 15, 1903.

As a result of negotiations, during the latter part of December, 1908, the consent of the Venezuelan Government was obtained for the detail of this medical officer, which had been objected to by a previous (Castro) administration.

Accordingly Acting Asst. Surg. W. H. Kellogg was assigned to duty in the office of the American consul at La Guaira by and with executive and departmental approval.

Acting Assistant Surgeon Kellogg assumed his duties on June 15, 1909. In the meanwhile, as was predicted, plague again appeared in Caracas, 13 cases with 5 deaths occurring between May 20 and June 17 of the fiscal year. The placing of a service officer in La Guaira at such an opportune time was productive of much good. Doctor Kellogg was accompanied to Venezuela by Passed Assistant Surgeon Grubbs, who joined him while en route from San Juan, P. R. Together they proceeded to Caracas and called upon the American minister there, who arranged meetings with the minister of the interior, the minister of foreign affairs, and the chief of the hygienic commission. These officials were anxious to inaugurate an antiplague campaign and gave the officers of the service their earnest cooperation.

After a conference with the American minister the cities of Caracas, La Guaira, and Puerto Cabello were inspected.

Acting Assistant Surgeon Kellogg was equipped by the bureau with a bacteriological outfit for the diagnosis of cases of either human or rodent plague. His duties therefore have been twofold, including the inspection and certification of vessels and their personnel, and the conduct of a bacteriological laboratory.

The transactions for the fiscal year were as follows:

Inspection and certification of vessels.

Steamships inspected and health bills issued	27
Sailing vessels inspected and health bills issued	1
Total	28
Ships fumigated	3
Baggage inspected and passed, pieces	138
Baggage disinfected, pieces	18
Total	156

Laboratory transactions.

Rats:	
Examined bacteriologically	72
Plague	0
Identified:	
<i>Mus decumanus</i>	43
<i>Mus alexandrinus</i>	26
<i>Mus rattus</i>	3
Total	72

Fleas identified (from 25 rats) :

<i>Pulox chcopis</i> -----	120
<i>Pulox irritans</i> -----	1
<i>Ctenocephalus canis</i> -----	1
Total -----	122

CALLAO, PERU.

Acting Asst. Surg. J. L. Castro-Gutierrez reports for Callao, Peru, for the fiscal year ended June 30, 1909, as follows:

One hundred and fifty-six vessels disinfected, 118 fumigated, 8,152 crew, 3,779 cabin passengers, and 2,757 steerage passengers were inspected; 2,200 persons received health certificates; 882 persons received vaccination certificates; 339 pieces of baggage were inspected and passed, and 2,556 pieces disinfected.

RIO DE JANEIRO, BRAZIL.

Acting Asst. Surg. W. J. S. Stewart.

An abstract from the weekly reports of this station shows that 172 vessels were inspected and issued bills of health, 1,505 cabin passengers were inspected, and 22 new crew shipped at Rio. The gross number of crews on vessels is not given, for the reason that the said crews were not shipped at Rio de Janeiro.

GUAYAQUIL, ECUADOR.

[See also page 104.]

Passed Asst. Surg. B. J. Lloyd reports as follows:

During the fiscal year bills of health were issued to 94 vessels, 90 of which were fumigated to kill rats or mosquitoes, or both. The usual inspection of vessels and personnel was maintained; immune certificates were furnished only to such persons as embarked for Peruvian ports, no quarantine being maintained by ports south on account of plague.

During the year a change in the schedule of the steamship companies provided for steamers direct from Guayaquil to the Canal Zone and return. As these vessels anchor some distance down the river and outside of the yellow-fever infected zone, passengers are allowed to go on board under supervision, two days in advance of sailing day, and thus complete their period of quarantine (six days) before reaching Ancon. This is a very important provision for those in transit across the Isthmus, for the reason that a difference of one day in quarantine will frequently make a difference of a week on the Canal Zone waiting for a steamer.

Passed Asst. Surg. William M. Wightman died on May 16, a victim of yellow fever. His detail was temporarily filled by Temporary Acting Asst. Surg. Carlos A. Miño.

General conditions.

Guayaquil is a city of about 80,000 population, spread out on low ground between the Guayas River and an extension of the Bay of Guayaquil, being about 5 kilometers long by from 1 to 2½ kilometers

wide. The houses are generally of wood, or at least if not built of ordinary lumber, are made of bamboo, with double hollow walls throughout, the walls being covered with a layer of "quina" to reduce the dangers from fire. The majority of these houses contain dark and badly ventilated rooms; in the better class of dwellings these rooms being occupied by servants. Many houses are built directly on the ground, but in the lower sections of the town there are many huts that are raised some 8 or 10 feet; and, though they are otherwise in miserable condition, these latter are usually well lighted and ventilated, and it is exceedingly rare that cases of plague are found in them. A few of the better streets are paved and sewered. Water is brought from a very good source, but the main pipe is too small to feed the extensive network of city mains. For this reason the storage tanks are never full and the supply of water is so deficient that the city mains are filled only twice during the twenty-four hours, and two hours later they are generally empty. On account of the fact that water is discharged through the pipes only during certain hours, each family must arrange for storing on the premises sufficient water to last during the rest of the day. Practically all houses have either storage tanks or barrels—generally the latter—each tank or barrel being a continuous breeding place for *Stegomyia* unless covered or otherwise treated. As many as 17 breeding places have been found in one house.

There are two seasons in Guayaquil, the wet and the dry, miscalled "winter" and "summer," respectively. The wet season begins about December 15 and lasts until about May 1. During this time, and especially during February, March, and April, the city is converted into one large marsh, the unpaved streets being practically impassable. As soon as the rains cease the yards and streets dry very quickly. From May until November the weather is cool, dry, and pleasant, the temperature ranging from 17° C. at night to 25° to 28° at midday, while from November to May it is hot and disagreeable, and after the 1st of January exceedingly wet. The annual death rate varies from 25 to 30 per thousand in July and August to from 90 to 100 per thousand in February and March, the yearly average being about 60, but varying greatly in successive years.

Bubonic plague.

This disease appeared in Guayaquil in February, 1908, spreading rapidly all over the city and causing during the first five months of its existence about 350 deaths in Guayaquil and about 30 deaths in Huigra. Later plague made its appearance in Babahoyo, Milagro, Tolte, Daule, Nisag, Alausi, and in adjacent plantations.

Prior to February, 1908, and for some time after, a rigid quarantine was maintained against plague-infected ports; this has been discontinued and only such vessels as are actually infected or which have docked in infected ports without having been subsequently treated are fumigated on arrival. There is no detention of personnel.

As soon as plague was known to exist in Guayaquil, traffic between this and other Ecuadorian ports was suspended and commerce was paralyzed; for a few days train service on the railroad was interrupted. This condition was soon remedied by the establishment of

the outgoing fumigation of river and coast vessels. This is still continued, over 1,200 fumigations being recorded for the year.

Organization.—With the consent of the bureau and Secretary of the Treasury and the approval of the State Department, Passed Assistant Surgeon Lloyd was authorized (March, 1908) to accept the proffered direction of sanitary measures in Guayaquil. Existing sanitary statutes being insufficient, an executive decree was given creating the special sanitary commission, which was latter replaced by the public health service, created by act of Congress in October, 1908, for the purpose of absorbing or replacing all other health organizations, and Doctor Lloyd was appointed acting director.

The duties of the public health service are to combat epidemic diseases throughout the entire Republic and to administer national, interprovincial, and interurban quarantines. Authority was granted by the decree creating the service to promulgate and enforce sanitary and quarantine regulations. In December, 1908, a code of sanitary regulations was formulated; the regulations were approved in April and published in June, and their legality was immediately disputed by the municipality of Guayaquil; on again being referred to the Federal Government the municipality has been overruled, and an attempt will be made to enforce them.

Briefly, these regulations embody the following measures:

(1) Isolation of persons suffering from smallpox, varioloid, plague, or yellow fever.

(2) The reporting of actual or suspected cases of such diseases.

(3) Compulsory vaccination against smallpox.

(4) Prohibition of breeding places of mosquitoes in water containers in houses and yards.

(5) Prohibiting the issuance of false death certificates.

(6) Making obligatory the installation of water-closets in houses facing on streets where there is a public sewer.

(7) The correction of defects in houses unfit for human habitation or in bad sanitary condition.

(8) Making obligatory the use of antipest serum in the treatment of bubonic plague.

(9) Establishing penalties for persons who maintain their premises in bad sanitary condition.

(10) Sundry general measures.

It is further provided that these regulations or such modifications of them as may be necessary may be applied to any city or community in the republic six days after being published in such locality.

Campaign against smallpox.

This disease has long been endemic in Guayaquil, causing from 150 to 400 deaths annually. For many years vaccination has been practiced, but never systematically; there exists a belief on the part of many that those who have been exposed to smallpox should not be vaccinated. Previous to the month of July of last year no attempt at isolation had ever been made. When work against smallpox was begun there existed about 30 cases, representing half as many foci, but by November 1 the disease had been exterminated. In April a doubtful case occurred and the usual precautions were taken; in June two mild cases were found and promptly isolated, all contacts

being vaccinated; these have been discharged and no further cases have developed.

In Quito preparations are being made to handle smallpox in the same way; in other places vaccination is being enforced; more or less severe epidemics have occurred in Manglar Alto and in the Canton of Santa Elena.

Measures against bubonic plague.

The victims of this disease gradually diminished in number until November, and during the month of October there was only one case and no death. At one time the lazaretto was completely empty and no case was known to exist. The same was true of smallpox and yellow fever. In the face of congratulatory telegrams and public clamor that the city of Guayaquil should be declared free from quarantinable disease, Doctor Lloyd was forced to warn the people that with regard to plague and yellow fever, at least, appearances were deceptive, and that both these diseases would reappear in a short time. The condition lasted just five days when plague slowly began to develop, the cases gradually increasing in number until April. Yellow fever did not develop as rapidly as plague until later, but by the middle of March was fairly epidemic. It seems now clearly established that for Guayaquil, at least, the plague season corresponds to the hot, wet (winter) season. The same is true of yellow fever, though cases of both diseases occur throughout the year, and plague may assume epidemic proportions at any time.

The use of antipest serum.—Doctor Lloyd does not advise the use of antipest serum as a prophylactic unless there are symptoms; as a curative it is invaluable; he advises from 40 to 80 c. c. to be given at one injection; the temperature is frequently a valuable guide as to when the dose should be repeated; from 400 to 600 c. c. are frequently required before the case can be considered to be out of danger.

Pregnant women treated early do not usually abort or miscarry. One woman was delivered of a living child, almost full term, which showed no manifestations of the disease and lived (temperature not taken). Apparently hopeless cases sometimes recover; a boy sent to the morgue, reported to have died suddenly (cause unknown), was found to be living; he was suffering from plague; recovered.

Destroying the infecting agency in houses where human cases or dead rats have occurred.—One-story huts which can be unroofed need no further treatment; if they are of adobe the interior may be burned over without material damage, and the floor, if of dirt and straw, or dirt alone, may be lightly saturated with kerosene and burned superficially; body clothing, beds, blankets, etc., may be spread out in the sun (if climate is favorable) and turned occasionally. So far these measures have proven very effective in Indian villages, where living conditions beggar description. In cities, plague-infected houses should be treated according to the condition of the house and its surroundings; if old, badly constructed, and a menace to the vicinity, every effort should be made to have the house torn down. The fact that a case of plague has occurred in a house is strong presumptive evidence that the house does not meet modern sanitary requirements,

unless infection can be clearly traced to some other source. Fumigation and disinfection of houses unfit for human habitation without obliging the owner to correct sanitary defects is money thrown away. The procedure in plague-infected houses at Guayaquil is: (1) To remove sick; (2) remove occupants, preferably disinfecting their effects, but if infection is already widespread this may be omitted; pyrethrum powder may be given such people to sprinkle in their clothing; (3) sprinkle good quality pyrethrum powder in every accessible part of the building, especially in dark corners, cracks, under floors, and wherever dust collects; (4) if funds are plentiful and infection not too general, surround the entire block with a rat-proof iron fence with the idea of limiting the infection to the block and thereby exterminating it; if there are sewers or drains other than iron pipes leading from the block, which can not be temporarily closed against rats, such a fence will be of little use; (5) take up ground floors in infected houses, tear out the inner walls, if walls are double, do the same with double ceilings, and rip open dark and badly ventilated rooms; (6) sweep up and burn (after half an hour) the pyrethrum mentioned in 2, together with all rubbish, especially such as is found under floors or in the runways of rats, rats' nests, etc.; (7) fumigate with sulphur, but do not attach too much importance to this measure nor to washing with antiseptic solutions; this may even be omitted; (8) leave the house unoccupied for fifteen days, exposing it daily to sun and air, leaving nothing that a rat can eat; (9) make a memorandum of what is necessary in order to put the house in condition for human habitation, pass this to the owner, informing him that the house can not be reoccupied until these improvements are made.

Campaign against rats.—The present outlook is that the only way to get rid of rats permanently is to *build them out of existence*. Until this is done the usual temporary measures may be applied. The necessity of keeping house and premises free from anything a rat can eat (except, of course, in receptacles out of their reach) can not be too strongly emphasized. If this is not done, poisons, traps, and viruses give very poor results.

Yellow fever.

This disease has been endemic in Guayaquil for many years. No reliable statistics are obtainable, but few nonimmunes who remain here for any length of time escape. Few people realize the extent of its ravages. The average resident immune manifests a profound indifference to its presence. The worst season is from November to May, February, March, and April being the worst months. From May until November the cases are few in number on account of the cool weather, although the *Stegomyia* breeds throughout the year. The conditions under which the mosquitoes breed are given in the following order: From May to December: (1) Barrels; (2) bath tanks; (3) small containers, such as earthenware jars (4 to 5 gallons or more) and similar receptacles; (4) storage tanks; (5) street wells and wells under houses or in yards; (6) water-closet tanks.

There are practically no other breeding places during this season. From December 15 to May 1 other breeding places must be dealt with, such as small pools in the yards and underneath the houses; accidental

containers, as bits of broken bottle, cans, flowerpots, certain plants, street pools, and gutters. It is very unusual to find *Stegomyia* breeding in the streets in Guayaquil, but they breed in small pools in the yards during the rainy season.

Because the funds authorized for sanitary work were wholly inadequate for the fumigation of all houses in the city or even all those in infected blocks, it was decided that the work against yellow fever should consist of the following measures (in addition to the isolation of cases): (a) Fumigation of infected houses; (b) covering of containers; (c) oiling; (d) ditching.

Ditching, as practiced in Guayaquil, does not play an important part in mosquito work. It is practiced every year merely to remove the excess of water, and the ditches are allowed to fill up during the dry season; no amount of ditching would remove the water from the yards during the rainy season in their present condition, as they are not infrequently lower than the level of the ditch.

Oiling is an important item of expense. Doctor Lloyd estimates that at least 30,000 gallons of crude petroleum are required for each of the months of January, February, March, and April; 20 inspectors, with 4 laborers each, are required to distribute the oil.

Fumigation of infected houses.—When cases of yellow fever occur in the houses of the poorer classes this presents no difficulty. Among the wealthier classes fumigation is eagerly sought in cases of plague, but not infrequently permission is roundly denied in cases of yellow fever.

Covering containers.—It has already been explained that the water supply of Guayaquil is deficient, necessitating the use of deposit tanks for bathing and other purposes. The average tank is a wooden structure, zinc lined and sometimes enameled, varying greatly in size. There are about 3,000 such in the city, practically all of which have been covered, the cost averaging about \$9 gold each, including labor and repairs. Every variety of cover was tried before satisfactory results were obtained. It was found that many tanks were old and a few blows with a hammer or the mere cleaning of such a tank was sufficient to start it to leaking. Such tanks required to be repaired before they could be covered, and for this work plumbers were employed. The round float which mechanically closes the intake would nearly always come in contact with the cover and prevent the action of the stopcock and the room would be flooded. This difficulty was met in most instances by turning the float upside down when it would not rise high enough to touch the cover. Provision had to be made for cleaning the tank and for repairing valves if they should subsequently get out of order, and for this reason covers were made with movable windows of wire netting, placed over the float and fastened to the main part of the cover with screws. The cover itself generally consisted of a wooden frame made to fit tongue-and-groove fashion over the tank wall and also screwed on. The frame was filled in with a kind of tarred burlap of a good finish, the window only being of wire netting. This gives better results than the use of wire netting alone and is much cheaper, prevents dust from falling into the water, and lasts well. Practically all of these covers are now in good condition.

Barrels.—Practically all houses in Guayaquil, including the better class of houses, have their water barrels, which are placed under the municipal key (spigot). In many cases these keys are placed so low that in order to raise the barrel to a height sufficient to enable water to be drawn with a spigot the municipal key would require to be spliced and raised. Covers were made of wood with windows of wire netting, and so long as they remained nailed on were satisfactory, except that not infrequently cockroaches would breed underneath such covers in large quantities and die in the barrel. Movable covers are useless. Not infrequently mosquitoes will lay their eggs on the damp wire netting and these or the recently hatched larvæ will drop into the barrel the next time the water is turned on. At first covers were not interfered with, but as soon as it became generally known that no fine would be imposed for removing covers they were promptly knocked off by the users of the barrels, and no amount of urging could induce the authorities to interfere. The only recourse left was to try larvæ-destroying fish. The so-called "million" fish (a small and very prolific minnow (?)) was imported from Barbados and hatcheries established. In the meantime two native fishes were tried. One of these would persist in jumping out of the barrels, though if persistently watched and replaced during the first day they would generally remain. The other remains indefinitely and thrives on such food as may chance to be present. These fish being much larger than the "million" fish, were objected to because they were supposed to "foul" the water, though plenty of similar fish exist in the deposits and in the stream from which the water is taken and no difference could be detected in the water. They are voracious larvæ destroyers. After experimenting with the "million" fish it was found that they reproduce with almost incredible rapidity in this climate, and even breed in water that is decidedly brackish. They are so small that the question of fouling the water is never raised. As an experiment from 2 to 10 fish were placed in each of about 250 barrels and other containers. Six weeks later an inspection revealed the fact that from about three-fourths of these containers they had disappeared. In some cases the barrels had become dry at some time through carelessness; in others they had been taken out by children; in still others they were found in the parlor in glass receptacles being kept for ornamental purposes. In about one-fourth of the barrels they were thriving and breeding. Barrels which were under immediate supervision, as in the lazarettos, those owned by inspectors and laborers, etc., were easily kept free from larvæ by these fish, and instead of having to replace fish that were lost it was not infrequently necessary to remove the excess of young. When bred too rapidly in small containers the young are frequently eaten by the adults. The "million" fish is too small to eat the larger larvæ, and it not infrequently happens that they will not free a barrel from larvæ until all the older ones that existed at the time the fish are put into the barrel are hatched out. Regulations were secured imposing fines on such persons as were found to have mosquito larvæ in containers on their premises or in their houses, and the use of these fish on a large scale was contemplated when funds failed and the regulations were disputed by the local authorities, and although enough fish exist at present to supply every container in Guayaquil no use is being made of them.

Statistics of transactions.

Bills of health issued.....	94
Vessels fumigated.....	90
Sulphur consumed (about).....tons..	18
Passengers inspected.....	3, 050
Crew inspected.....	5, 685
Baggage inspected (pieces).....	4, 240
Baggage disinfected (pieces).....	816
Immune certificates given.....	106

The following is taken from Doctor Lloyd's annual report to the Ecuadorian Government:

From the following figures it might be deduced that there has been much more yellow fever during the present season than during the same period for last year, but even were this the case it would be a sufficient reason for making the work more efficient. When it is remembered that formerly there occurred some 500 deaths annually of persons who were never seen by a physician and no diagnosis made, it will readily be understood that these statistics may be in part misleading. The fact must also be borne in mind that mosquito work was suspended in part in January and altogether in March, and has not yet been resumed.

YELLOW FEVER.

Month.	1908.		1909.	
	Cases.	Deaths.	Cases.	Deaths.
January.....	Unknown.	12	12	6
February.....	Unknown.	26	38	23
March.....	Unknown.	18	114	57
April.....	Unknown.	18	69	46
May.....	Unknown.	10	50	31
Total.. ..		84	283	163

Total suspension of yellow fever work in March, 1909.

GENERAL MORTALITY—SAME PERIOD.

1908.		1909.	
Months.	Deaths.	Months.	Deaths.
January.....	311	January.....	256
February.....	386	February.....	303
March.....	604	March.....	417
April.....	503	April.....	386
May.....	354	May.....	349
Total.....	2, 158	Total.....	1, 711

Difference, 447.

During the same period for 1908 and 1909 there were 314 and 88 deaths from plague, respectively; of smallpox, 64 persons died in 1908 and none in 1909. Deducting these deaths, there still remains a difference of 157 for 1908 over 1909, and yet the statistics for yellow fever are much higher in the latter year. This increase is apparent, not real.

From the 1st of January, 1908, to the 1st of October of the same year there were 111 deaths from smallpox in Guayaquil; during the last eight months there have been no deaths from smallpox.^a

^a It is now nearly one year since there has been a death from smallpox; several times the infection has been reintroduced, but each time has been promptly controlled.

HONGKONG, CHINA.

Acting Asst. Surg. J. S. Hough in charge.

During the fiscal year ended June 30, 1909, 457 vessels were inspected and bills of health granted.

SHANGHAI, CHINA.

On September 29, 1908, owing to the reappearance of plague and cholera in the Shanghai consular district, Dr. S. A. Ransom was appointed an acting assistant surgeon in the service and reassigned to duty in the office of the American consul at Shanghai.

His report therefore covers the period from September 29, 1908, to June 30, 1909—about nine months.

Transactions.

Vessels spoken and passed.....	42
Steamers inspected and passed.....	62
Steamers disinfected	16
Number of crew on steamers.....	14, 666
Number of passengers on steamers.....	9, 183

All vessels taking bills of health from this port to ports in the United States, with the exception of those under the head of "Spoken and passed" are inspected by the service officer as near as possible to the hour of sailing. This inspection consists of an examination of the entire personnel, of the inspection of the living quarters, and of a search through the ship's papers, manifests, and "boat notes" to see that the regulations governing cargo have been complied with. Manifests are certified for the information of the quarantine officer at the port of arrival of the vessel.

In the case of vessels bound direct for ports in the United States or in the Philippines, the crew and steerage passengers are bathed and their effects disinfected by steam immediately before the departure of the ship, and the living quarters are rendered mechanically clean and disinfected when necessary.

AMOY, CHINA.

Upon the request of the Department of State and in accordance with the act of Congress approved February 15, 1893, Passed Asst. Surg. A. D. Foster was detailed to serve in the office of the United States consul at Amoy, China. He assumed his duties on March 5, 1909, from which time to the close of the fiscal year ended June 30, 1909, the following report is made to include all transactions:

Twelve bills of health were issued to vessels, all of which were bound for Philippine ports. Seven hundred and forty-eight crew, 439 cabin, and 1,208 steerage passengers were inspected. Thirty-one aliens were rejected for causes as noted, viz, trachoma, 25; favus, 3; scabies, 2; leprosy, 1. Six thousand and eighteen pieces of freight were certified, of which 6,013 pieces were shipped to ports in the Philippine Islands and 5 pieces to United States ports.

Owing to the prevalence of smallpox in this port all passengers who did not show evidence of having been recently successfully vaccinated were vaccinated a few days prior to sailing. Before issuing the bill

of health the crew and all passengers are inspected on board at the hour of sailing.

On January 8, 1909, a letter was received by the American consul in Amoy from the insular collector of customs at Manila stating that Chinese domiciled in the Philippine Islands visiting China are, when returning to the Philippine Islands, no longer to be debarred under the provisions of the act of Congress of February 20, 1907.

Accordingly the examination of passengers for diseases or disabilities which would exclude them from the Philippines under the immigration law is limited to those Chinese going to the Philippines for the first time and who belong to the privileged classes, viz, merchants, travelers, students, wives, and minor children of Chinese merchants domiciled in the Philippine Islands. For this reason the percentage of rejections at this port is low.

At the request of the American consul applicants for extension certificates are examined and an opinion rendered as to their physical condition by the medical officer of the service. Chinese who depart for China from the Philippines to return are given a "return certificate," good for one year, and may be granted an extension certificate by the American consul on account of sickness or other disability.

The following quarantinable diseases were present during the fiscal year in Amoy: Plague, leprosy, smallpox, and cholera.

Plague first appeared in the month of March, and with the advent of hot weather the number of cases steadily increased until at the end of the fiscal year it was considered epidemic.

It is impossible to estimate the number of cases of leprosy in Amoy. No attempt is made to segregate lepers. They are frequently observed on the streets and in the dispensaries of the mission hospitals.

Smallpox is quite prevalent during the greater part of the year, but in the summer months the number of cases diminishes considerably. Vaccination is extensively practiced by the Chinese in Amoy. Large quantities of Japanese vaccine, which is put up in capillary glass tubes, are imported from Japan and Formosa. The practice of inoculation into the nose with virus from smallpox patients is still carried out by some of the Chinese.

About the middle of June information was furnished by a Chinese physician in the Amoy hospital that cholera had appeared in the city, and also in Kang Thau, a village on Amoy Island, about 4 miles distant.

In order to obtain information as to the prevalence of cholera, plague, and smallpox in the vicinity of Amoy, forms printed in both the Chinese and English languages were sent to physicians practicing in the Province, and they were requested to fill them out and return them by mail to the service officer at the end of each month.

The disinfecting barge which was recently purchased by representatives of one of the steamship companies for bathing and disinfection of clothing and baggage of steerage passengers embarking for the Philippines is now ready for use.

The sanitary condition of Amoy is exceedingly bad, owing largely to the lack of a sewer system and to an insufficient water supply. Rain and waste water is carried away by means of gutters beneath the flagstones of the streets. During the rainy period the gutters overflow, leaving the streets covered with filth. The city is dependent on wells for its water supply. They are readily exposed to contami-

nation, owing to the fact that they are uncovered, and in the majority of cases are level with the surface of the ground.

YOKOHAMA, JAPAN—QUARANTINE AND SANITATION IN JAPAN.

Passed Asst. Surg. Hugh S. Cumming reports, in part, as follows for the fiscal year ended June 30, 1909:

Steam vessels inspected and granted bills of health.....	224
Sailing vessels inspected and granted bills of health.....	11
United States war vessels granted bills of health without inspection.....	28
Total number of bills of health granted during the year.....	263

DESTINATIONS AND NUMBER OF ABOVE VESSELS, WITH NUMBERS OF PERSONNEL.

Port.	Vessels.	Saloon passengers.	Steerage passengers.	Crew.
San Francisco, Cal., and Honolulu, Hawaii.....	57	3,236	8,929	10,397
Seattle, Wash.....	50	794	4,064	5,499
Tacoma, Wash.....	8	53	145	554
New York, N. Y., via.....	26	1	.....	1,303
Manila, P. I., via.....	58	932	3,062	5,709
Cebu, P. I.....	2	.....	.....	186
Boston, Mass., and New York, N. Y.....	2	2	.....	72
Port Arthur, Tex.....	2	.....	.....	110
Honolulu, Hawaii, only.....	1	.....	.....	30
Portland, Oreg.....	13	.....	.....	746
Gaviota, Cal.....	1	.....	.....	48
Cavite, P. I.....	1	.....	.....	52
Port Townsend, Wash.....	1	.....	.....	42
South American ports via Honolulu.....	2	10	772	243

RECAPITULATION.

	Vessels.	Saloon passengers.	Steerage passengers.	Crew.
Steam.....	224	5,033	16,972	24,991
United States ships.....	28	77	.....	15,069
Sailing.....	11	5	.....	226
Total.....	263	5,115	16,972	40,286

Number of persons required to bathe and undergo special inspection.

Passengers for the United States or Hawaii or Manila.....	1,234
Passengers for British Columbia on vessels for United States.....	290
Members of crews.....	390

Total bathed and examined.....	1,914
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Pieces of baggage disinfected under supervision.....	4,030
Vessels fumigated or disinfected, etc., in whole or partly.....	30
Quarantinable disease detected at time of final inspection.....	1

The continued spread of bubonic plague over both hemispheres shows the absolute necessity of continued vigilance. One of the most important methods of combating its advance is undoubtedly the periodical fumigation of vessels trading in infected ports; in fact, this would seem to be the most important method, except the impracticable one of preventing the invasion of vessel or cargo by rats.

Therefore, the service has continued to fumigate all vessels at Yokohama desiring bills of health if the vessels are empty and there is a history of possible infection. Yokohama is the terminal and starting port of many cargo lines trading between that port and New York via any port in Asia where cargo offers. Such vessels are almost invariably fumigated there, but the treatment of the crew is deferred until the port is reached, at which the crew is discharged and a new crew enlisted. Unfortunately Singapore, where there is no medical officer, is the usual port for the discharge and enlistment of Lascar crews.

There are two lines of mail steamers which ply between Yokohama and the ports in Australia via Japan and China ports, Hongkong and Manila. By suggestion of the chief quarantine officer of the Philippines a certificate of fumigation from the British health officer at Brisbane is accepted in lieu of fumigation of one of the line, the North German Lloyd, and the vessels of the other are fumigated at Yokohama every trip.

The vessels of the Nippon Yusen Kaisha running to Seattle and Manila and those of the North German Lloyd to Manila all lie at the customs docks at Yokohama, and as there are many vessels constantly at the same wharf from plague-infected ports, the steamers for American ports are compelled to use rat guards. The wisdom of this routine is shown by the enormous number of rats, some infected, which have been killed by the local health authorities at Yokohama, upon some of the other vessels since they instituted quarantine against Shanghai.

The policy of bathing and disinfecting the effects of persons traveling steerage upon vessels bound for American ports, whether the individual is to disembark at Victoria or other ports before the vessel reaches her American destination is continued, whether this immediate vicinity be infected with quarantinable disease or not.

Cargo is inspected or handled by having all consular invoices submitted to the service officer before final clearance in the consulate, and by initialing, for convenience of the loaders, all shipping notes. For the convenience of the quarantine officers at the home ports, manifests are also signed just before the vessels sail. Doubtful cargo is personally inspected and a close watch kept upon godowns.

Sanitary conditions in Yokohama.

The official census of December 31, 1908, shows a population of 392,870 living in 78,138 houses, with total deaths during the year of 3,286 males, 2,793 females, total 6,079; and total births during the year of 4,132 males, 3,976 females, total 8,108.

The population according to the census of 1907 was 378,884 living in 74,572 houses, an increase of 15,986, the registered births having been 8,201 and the deaths 5,411, while for the year 1906 the census showed a population 29,022 less than 1907.

The death rate for the past year shows per mille 15.46, as against 14.28 for 1907, 11.12 for 1906, and 12.7 for 1905. As will be shown below, this increase was not due to reportable diseases, which were only about 60 per cent of those of the preceding year, and it was probably due to general diseases whose mortality and incidence were increased by poverty and its inevitable results due to the bad indus-

trial and economic conditions which, here as elsewhere, prevailed. Here in Japan, as elsewhere, the agricultural classes have not suffered, to which may be attributed the decrease in percentage of increase of population.

REPORTABLE DISEASES HAVE OCCURRED AS FOLLOWS, YEAR ENDED JUNE 30, 1909.

	Cases.	Deaths.	Remarks.
Cholera.....	4	4	All in the first half year (June to January).
Plague.....	22	16	All in the second half year.
Typhoid fever.....	293	70	228 cases, 54 deaths first half; 65 cases, 16 deaths second half.
Diphtheria.....	151	35	75 cases, 17 deaths first half; 76 cases, 18 deaths second half.
Scarlet fever.....	21	6	15 cases, 4 deaths first half; 6 cases, 6 deaths second half.
Dysentery.....	115	22	99 cases, 18 deaths first half; 16 cases, 4 deaths second half.
Total.....	606	103	

Against a total of 1,027 cases and 338 deaths during the year ended June 30, 1908, of which 413 cases and 142 deaths were from smallpox.

Cholera.—Four cases occurred last summer and were probably sporadic.

Typhoid fever showed an increase of about 46 per cent.

Diphtheria showed a decrease of 25 per cent.

Scarlet fever showed an increase of 1 case.

Dysentery showed an increase of 9 per cent.

Smallpox.—One (doubtful) case occurred, as against 424 reported last fiscal year.

Bubonic plague.—Every year about the month of January plague-infected rats, although few in number, generally begin to be reported, and increase until after the “rice rains” are over, in July. Two rats were reported November 4 and 17, and no others until February, when one was picked up in the street in the center of the city. Since this time they have been found at frequent intervals.

April 30 an umbrella mender was attacked with plague, but the infection was apparently traced to rice from Formosa which arrived on the *Fukuoka Maru*, upon unloading which steamer, after fumigation, some infected rats were found. Repeated outbreaks of plague were traced to imported rice, and the fumigation of all vessels from Rangoon and Saigon was continued, and of those vessels from Formosa fumigation was begun before unloading. In addition to this, a municipal order was issued to disinfect all of the 3,000 houses where rice, straw, gunny bags, rags, etc., are kept, and to forbid the removal of those articles from the infected districts until after disinfection. Up to the present time there have been 26 cases of plague reported in various districts. The city assembly has voted to grant a bonus of 50 sen to the owner of each female cat which litters, and to continue the purchase of rats in addition to the use of arsenic phosphorus and other poisons and the use of traps.

Leprosy.—The practical segregation of lepers has been started, for they are no longer noticed in the foreign settlement as formerly.

Rinderpest and rabies have both appeared in epidemic form in Yokohama and elsewhere throughout the Japanese Empire.

SANITARY CONDITIONS THROUGHOUT THE EMPIRE.

Reportable diseases occurring throughout the Empire, exclusive of the island of Taiwan (Formosa), during the year ended December 31, 1908.

	Cases.	Deaths.		Cases.	Deaths.
Cholera.....	652	401	Scarlet fever.....	860	128
Dysentery.....	32,721	7,843	Diphtheria.....	17,790	4,971
Typhoid fever.....	24,494	5,331	Plague.....	347	280
Smallpox.....	18,067	5,837			

Cholera.—There is some doubt as to the nature of the four cases in Yokohama, but the disease reached Moji-Shimonoseki as usual first early in July, almost certainly from China, and 300 of the total cases were in those prefectures (Yamakuchi-Fukuoka). Later it occurred at Kure naval station, on Shikoku Island, and in November there were 22 cases in Tokyo. Several cases occurred on an English steamer from India, via China ports and Moji, after her arrival at quarantine here.

Dysentery.—A terrible epidemic, with 7,468 cases and 2,143 deaths, occurred in Kagawa Ken, on Shikoku. The widespread and fatal epidemic is shown by the annexed detailed statistics of this and other diseases.

Typhoid fever.—The water supply of Yokohama is reported to be exceptionally good, and that of the other large cities as good as that of many of the cities in the United States, and the occurrence of the disease is attributable to the use of human excrement and the eating of raw vegetables and shellfish which have been fattened in canals which run through cities and are contaminated with filth.

Smallpox.—The severe epidemic with 18,067 cases and 5,837 deaths was a continuation of the epidemic mention of which was made in the last annual report. Rigid vaccination rules have this year been enforced and there has been in consequence almost the total disappearance of the disease.

Scarlet fever caused only 128 deaths, of which 94 were in Tokyo, Osaka, and Kyoto. The disease is of recent importation and is mild in form.

Diphtheria is extremely common all over Japan, and despite the enlightened action of the Imperial Government in furnishing practically free antitoxin and the widespread knowledge of its usefulness, the official statistics show a rather heavy mortality of 27.9 per cent.

Bubonic plague.—Of the 347 cases and 280 deaths it is not unfair to say that nearly every case could be traced directly or indirectly to Kobe and Osaka.

The most interesting events related to plague are the elaborate studies made by Doctor Kitasato and his assistants of the outbreak of pest on Yura Island, near Kobe, especially in regard to the relative incidence and importance of varieties of fleas with regard to pest.

An incident of quarantine interest was the occurrence of plague upon the steamship *Isukushima Maru* after a voyage of several weeks from Peru. She had carried from Kobe many emigrants without

illness having been detected upon either voyage until after arrival at Kobe.

Despairing of the destruction of rats and eradication of pest by present methods, the authorities have attempted to take advantage of the suggestions made by Koch and Kitasato in regard to the use of cats, and official suggestion is made for householders to keep cats, and there has been an attempt to introduce good ratting breeds from India.

Pest having repeatedly been traced to cotton and rice imported from India and Cochin China, and both of these products being absolutely essential to the well being and industrial progress of the Empire, cargoes of these products are now fumigated with CO gas before discharge.

The attention of the bureau has been invited to the opening of the new coaling port of Miike, to which port it is stated the United States army transports will in the future go for coal in place of Nagasaki.

KOBE, JAPAN.

Acting Asst. Surg. C. P. Knight reports in part as follows on the transactions at this station during the fiscal year ending June 30, 1909:

Vessels inspected and passed.....	228
Vessels disinfected.....	17
Passengers inspected.....	19, 338
Crew inspected.....	23, 031
Packages of freight viséed.....	2, 092, 147
Pieces of freight inspected and disinfected.....	1, 845
Cases of quarantinable diseases inspected.....	5

The sanitary condition of the city during the fiscal year is reported to be fair. Among the prevailing diseases were cases of measles, typhoid fever, diphtheria, and a few cases of plague. Fortunately plague has not been found in the vicinity of the water front of Kobe or in the shipping districts, it being mostly confined to the old part of the town among the poor classes.

The godowns and lighters where cargo is stored are all in a good sanitary condition, and are practically kept clear of rats.

The number of rats examined during the year was 743,851, of which 2,349 were found plague infected. Of the number caught along the water front none were found to be plague infected, according to the report of the Japanese officials. A thorough house cleaning of the whole city has been performed three times, since January, 1909, with a view of destroying rats. The city government pays 2½ cents apiece for these rodents, thereby encouraging the poorer classes to rid their neighborhood of them. The sewage system of the city as a whole is very poor, being the open-drain system. A most unhygienic practice among the natives is to scoop the filthy water from the sewers and sprinkle it upon the streets, thereby transmitting disease by the germ-laden dust.

The water supply of Kobe is good. It comes direct from the hills, where there is no contaminating drainage, and is then purified through excellent filters. A chemical and bacteriological examination is made daily by the health authorities of the city.

The official report of infectious diseases during the year is as follows:

	Cases.	Deaths.		Cases.	Deaths.
Cholera.....	None.	None.	Smallpox.....	10	2
Typhoid fever.....	159	32	Scarlet fever.....	3	0
Dysentery.....	133	20	Plague.....	37	33
Diphtheria.....	93	28			

It is worthy of note that no cholera has appeared in Kobe this year.

NAGASAKI, JAPAN.

Acting Asst. Surg. Thomas J. Thompson reports for the fiscal year ending June 30, 1909, as follows:

Total number of vessels inspected.....	120
Total number of passengers examined.....	29,482
Total number of crew examined.....	22,114

In September, 1908, cholera appeared at several points in this consular district of Nagasaki, but it did not gain a footing in Nagasaki. One or two ships arrived with cholera on board, or having had it on the voyage. These were effectively treated at quarantine, so that it did not spread. There were no deaths from the disease.

CALCUTTA, INDIA.

Acting Asst. Surg. A. Smith Allen reports: During the fiscal year 73 vessels were inspected, with 4,003 crew, and the personal effects of the members of such crew were disinfected in accordance with the quarantine regulations.

LIBAU, RUSSIA.

Owing to the prevalence and spread of Asiatic cholera in Russia, and the danger of the importation of this disease through immigrants arriving in the United States, a medical officer of the service, Acting Asst. Surg. C. M. De Forest, was assigned to duty in the office of the American consul at Libau, Russia, on September 26, 1908. This officer assumed his duties on October 12, 1908, from which date to the end of the fiscal year the transactions were as follows:

Number emigrants examined.....	14,790
Number emigrants sailed.....	11,716
Number held back.....	3,074
Number held for trachoma and favus.....	2,934
Number held back by representative of the Public Health and Marine-Hospital Service.....	140

Diseases certified to:

Measles.....	24
Scarlet fever.....	2
Chicken pox.....	9
Diphtheria.....	9
Leprosy.....	1
Smallpox, 1; exposed to smallpox, 56.....	57
Fevers and suspected cases.....	38

Total.....	140
Total baggage disinfected from October 12, 1908, until August 24, 1909.....	2,868
Crew and officers examined from October 12, 1908, until August 24, 1909.....	1,623

Libau is a city of 100,000 inhabitants, situated directly upon the water front of the Baltic Sea. The water supply of the city is taken from about 300 artesian wells. These are situated in various parts of the city and the water is pumped by hand. There exists no system of water pipes or hydrants. Therefore it is reasonable to suppose that no epidemic of cholera can occur in Libau, although there may occur a few imported cases.

Emigrants are examined up until the evening of the sixth day preceding the sailing of the vessel, but none are examined after that time. They are held in Libau for five full days prior to their departure. Each single person or family is given a card by the representative of the service, containing the name and age of each member of the family, and the printed card states that they are free from evidence of quarantinable disease. This card is dated and stamped. Then upon the day of sailing all passengers are again examined and the card above mentioned is again stamped with a date stamp marked "Second inspection." All cases having no quarantine card, those having cards which are not stamped, and all cases of illness and suspected cases are not allowed to board the ship and are held over until the next boat, two weeks later.

All passengers, cabin and steerage, are, as far as the time for quarantine is concerned, treated alike. No evidence except that of a personal examination of the passenger is accepted.

The officers and crew of every ship are examined every day for five days prior to sailing, and no new man for the crew is shipped at Libau unless he has been there for more than two weeks.

Personal inspection of the ship is made on the day of sailing.

Inspection of all baggage is made and all eatables, such as bread, herring, cucumbers, fruit, etc., and all drinkables are removed, and all the large baggage—not hand baggage—is thoroughly disinfected by the use of formaldehyde gas. The disinfection is carried out by a sanitary official of the city of Libau.

During the last three months a new building has been erected for the disinfection of the baggage.

Within the last three months three new emigrant houses have been leased by the steamship company and have been remodeled and made clean and in good sanitary condition. Each is capable of housing from 100 to 250 emigrants. Not more than 20 people are allowed to sleep in a room. The number is regulated by the sanitary police, who measure the rooms and allow each person about 500 cubic feet of air space. The number allowed for each room is posted upon the door of each room.

In the event quarantinable disease appears in any one of the emigrant houses nobody from that house is allowed to sail until all have undergone the period of incubation of the disease. Libau is the only port in Russia from which emigrants sail direct to the United States.

METHODS EMPLOYED IN CHINESE AND JAPANESE PORTS BY THE SERVICE OFFICERS FOR THE PREVENTION AND DESTRUCTION OF RATS ON VESSELS DESTINED TO UNITED STATES PORTS.

[See chapter on International cooperation against plague, etc., p. 102.]

Hongkong, China.—All vessels on the regular routes between Hongkong and the United States ports are required to undergo, while empty, sulphur fumigation every six months.

All vessels "dry docking" in Hongkong are fumigated after leaving the dock.

All "occasional" or "tramp" vessels calling at Hongkong from any port in China must be fumigated before a bill of health is granted.

During the past year many of the vessels have been disinfected at San Francisco, and when this was done, and a certificate from the medical officer of the service produced, the fumigation was waived at Hongkong.

The Nippon Yusen Kaisha, a Japanese line plying regularly between Hongkong and Seattle, require their vessels to be fumigated on every trip, i. e., about once in three months. This is the company's regulation, but the service officer is often required to supervise it.

There are three steamship lines running vessels from Japan to Australia via Hongkong and Manila, and these vessels are fumigated each trip, either in Japan or Australia, as is required by the Australian Government.

One line of vessels—the Arthur Holt Steamship Company—plies between England and Seattle via Malay Straits and China and Japan. All of these vessels are fumigated when empty in Liverpool, and always have a certificate of disinfection from the United States consul.

When the systematic fumigation was started about four years ago great numbers of rats were killed on every vessel. Now, however, the number found on the regular steamships is very small, showing that the fumigation is effective.

Very few of the vessels go alongside the wharf in Hongkong.

Shanghai, China.—Vessels bound for American ports are not allowed to go alongside the wharves when loading, with the single exception of the French line around the world from Havre to San Francisco, and the exception is made in this case only because of the fact that these vessels carry very heavy structural iron cargo for Shanghai and the interior and it would be difficult if not impossible to lighten it. These vessels place rat guards on all their lines, as is required of all vessels taking bills of health from Shanghai for the United States, and adopt the other precautions previously reported.

A close supervision is kept over vessels bound for the United States. It not infrequently happens that no rat guards are found on the lines to lighters alongside the vessels, and in such cases the attention of the agents is drawn to the fact and a note of the omission is made on the bills of health. The lighters are fully as dangerous as the wharves, as during the time they are not in use or are undergoing the process of loading they often lie at docks where infected rats have been found, and the lighters themselves are not infrequently infested with rats. Their periodic fumigation has been suggested.

Cargo in which rats might make nests is inspected.

Loading in Shanghai is done as far as possible by daylight.

Yokohama, Japan.—(1) Trade with the Pacific coast of America direct or via Hawaii: The trade is conducted, with few exceptions, in vessels of the various mail lines, the port of origin of which is Hongkong, in which port the vessels of such lines, i. e., Pacific Mail, Toyo Kisen Kaisha, to San Francisco via Hawaii, Nippon Yusen Kaisha, Great Northern, Bank, and other lines to Puget Sound, lie empty, or while unloading and cleaning for an average period of ten days. Upon arrival at Yokohama these vessels have taken on cargo at Hongkong, Amoy, or Keelung (during the tea season only), Shanghai, Nagasaki,

Kobe, Yokkaichi, Shimidzu (during tea season only), and Yokohama, which is the last port of call and at which these vessels lie for about two days.

All vessels, except those of the Nippon Yusen Kaisha, lie out in the open bay at Yokohama, and these vessels are compelled to use rat guards while at the dock, and have a light on the gangway at night if one be used. Exceptions to origin in Hongkong are (*a*) vessels of the Alfred Holt (blue funnel) Line from Liverpool via Suez, Colombo, the Straits Settlements, China, and Japan ports for Seattle and Victoria. These vessels bear a certificate on the original bill from Liverpool or Glasgow, showing fumigation while empty, and consular statements on the supplemental bills as to use of rat guards in Singapore and Port Said; (*b*) vessels of the Chargeurs Reunis, which follow a similar course, and bear fumigation certificates from Havre, and which, after leaving Yokohama, sail for Hawaii or Seattle direct; and (*c*) an occasional oil steamer.

All of the above vessels are more or less completely loaded upon arrival, and it is impracticable to fumigate them at Yokohama. All are or should be fumigated at port of departure.

(2) Vessels having Yokohama as their port of departure include: (*a*) A large number of freight vessels trading between Yokohama and New York and touching at any port of Japan, China, the Straits Settlements, Malabar or Coromandel coasts of India and Africa, including Manila or Cebu during the sugar and hemp seasons. These vessels are empty at Yokohama and are invariably fumigated by the service officer unless they have just been treated at Manila or have not stopped at infected ports. Their crews are usually Lascars shipped at Singapore on their way to America, or else Chinese shipped from Hongkong. They are bathed and disinfected at Yokohama, Shanghai, Kobe, or Hongkong. (*b*) The mail steamships of the North German Lloyd, Nippon Yusen Kaisha, and China Navigation Company (blue funnel), plying between Yokohama and Australia via Manila, carry physicians. The Japanese vessels are fumigated at Yokohama, but the British and German steamers, under agreement with the chief quarantine officer for the Philippine Islands, are not so treated if carrying a certificate of fumigation at Melbourne or Hongkong. (*c*) Vessels of the Pacific Mail, Toyo Kisen Kaisha, and Great Northern lines stopping at Yokohama en route from Pacific coast ports to Manila are simply inspected and not fumigated.

Nagasaki, Japan.—There being no wharves or docks at the port of Nagasaki, vessels are moored in the stream and are loaded and coaled from small open lighters, the bottom boards of which are movable. Measures for rat destruction are actively enforced, and a reward is given for every rat delivered.

Kobe, Japan.—Vessels taking out an original bill of health at Kobe port are fumigated with SO_2 for twenty-four hours, using 3 pounds of sulphur to the 1,000 cubic feet in order to destroy the rats in the holds. When a vessel comes into port empty it is fumigated within a reasonable length of time afterwards.

The periodical fumigation of vessels at Kobe is practicable always, except when the vessels are laden with cargo.

Amoy, China.—Owing to the fact that there are no docks at Amoy vessels are obliged to make fast to buoys in the stream which separates Amoy Island from the island of Kulangsu. The width of the

stream between the two islands is about 700 yards and ocean-going vessels anchor well out for the reason that small river craft occupy the anchorage near the shore.

Vessels take on cargo only during the daytime. The cargo is conveyed by means of small lighters which make fast to the vessel. Rat guards are not placed on the lines. There is no opportunity in this port for rats to gain entrance to vessels by means of lighters.

There is almost no steamship traffic between Amoy and United States ports. During the past eighteen months but two vessels have been granted bills of health at Amoy for United States ports. The trade is principally with the ports of the Philippine Islands. About 5,000 Chinese laborers leave Amoy each year for the Philippine Islands.

Periodical disinfection for the purpose of eradicating rats from vessels has been carried out upon their arrival at the quarantine station at Mariveles near Manila, P. I., but in the future vessels will be disinfected by the service officer at Amoy prior to departure. A disinfecting barge containing a sulphur furnace, two steam chambers, and facilities for bathing steerage passengers has been purchased by representatives of one of the steamship companies at Amoy for use in connection with the Philippine Island traffic.

LECTURES ON QUARANTINE PRINCIPLES AND REGULATIONS TO NEWLY APPOINTED CONSULAR OFFICERS.

It has been the custom for the Department of State to require every new class of consular officers to attend a special course of instruction, during which lectures are given on various conditions with which they are likely to be confronted while on duty in their prospective stations in foreign countries. These lectures include the discussion and explanation of the various regulations with which a consular officer must be familiar.

By the terms of the act approved February 15, 1893, every vessel clearing at a foreign port for a port in the United States is required to obtain a bill of health from the United States consular officer. In the rendering of such a bill of health it is essential that the consular officer be not only familiar with the United States quarantine regulations, but that he should have a general idea of sanitary matters, to enable him to know how to watch for and suspect infection in the port or place wherein he is stationed.

To fulfill these requirements a request was made of the bureau last year for the detail of a medical officer to contribute a discourse on the United States quarantine regulations and their practical application at foreign ports.

This lecture was said to have been favorably received, and on July 22 of this year the request for a similar lecture was made, there being a new class of consular officers attending the regular course.

The bureau was pleased to comply with this request, because the public-health work performed jointly by the consular corps and the service is growing daily in importance, as well as in volume, and the reports made by consular officers and the good account to which they are turned by the service are matters of constant comment. Too much can not be done to make more perfect the joint operations, the value of which is so generally recognized.

MEDICAL INSPECTION OF IMMIGRANTS.

During the fiscal year ending June 30, 1909, 966,124 immigrants were examined by medical officers of the service to determine their physical fitness for entrance at ports in the United States and its dependencies, Porto Rico and Hawaii. Fourteen commissioned officers and 50 acting assistant surgeons were assigned to this duty exclusively, and a large number of officers, primarily engaged in other service duty, examined aliens whenever presented to them. During the fiscal year 14,536 aliens were certified for physical reasons. The officers of the service stationed at the consulates for quarantine duty in Italy, Japan, and China also inspected departing aliens at the request of the Department of Commerce and Labor, this work at some ports exceeding in volume and difficulty the quarantine function.

As in previous years the function of the officers at foreign ports is advisory to the transportation companies, and the number of undesirable emigrants reported to have been refused on the advice of these officers bears testimony to the value of the work.

The following table furnishes a summary of the transactions at the several ports in the United States and in its dependencies and in Canada:

TABLE SHOWING NUMBER OF ALIENS INSPECTED AND CERTIFIED AT ALL PORTS AND PLACES IN THE UNITED STATES AND IN ITS DEPENDENCIES AND IN CANADA.

[For transactions at foreign ports, see page 191.]

Stations.	Number of aliens examined.	Number of aliens certified.				Important diseases for which certification was made.									
		Class I.	Class II.	Class III.	Class IV.	Total.	Tuberculosis.	Insanity.	Idiocy.	Imbecility.	Feeble-mindedness.	Favus.	Syphilis.	Tinea tonsursans.	Gonorrhea.
		Dangerous, contagious.	Insanity and idiocy.	Loathsome.	Likely to become a public charge.										
Astoria, Oreg.	2,699	2	0	0	15	17	1	3	1	2	1	2	1	1	1
Baltimore, Md.	20,610	32	3	3	510	548	32	1	1	2	1	2	1	1	1
Bellingham, Wash.	None.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boston, Mass.	48,132	15	9	10	362	396	10	6	1	1	1	5	4	1	1
Blaine, Wash.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brownsville, Tex.	1,199	66	3	1	18	88	65	1	2	1	6	0	0	0	0
Brunswick, Ga.	77	1	0	0	1	4	77	4	0	0	0	0	0	0	0
Buffalo, N. Y.	3,449	77	3	1	21	102	77	4	0	0	0	0	0	0	0
Calexico, Cal.	510	3	0	0	0	3	0	0	0	0	0	0	0	0	0
Charleston, S. C.	71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chicago, Ill.	93	13	8	0	61	82	4	69	0	2	4	0	0	0	0
Douglas, Ariz.	242	3	1	0	5	9	1	1	0	0	0	0	0	0	0
Detroit, Mich.	3,391	110	2	16	248	376	101	1	1	1	1	1	1	1	8
Duluth, Minn.	4,745	24	4	1	10	39	24	3	1	1	0	0	0	0	0
Eastport, Idaho.	1,061	3	0	2	2	7	3	0	0	0	0	1	0	0	0
Eagle Pass, Tex.	1,895	53	4	10	33	80	23	4	2	0	0	0	7	3	3
El Paso, Tex.	22,465	21	3	4	107	135	14	3	0	0	0	0	0	2	2
Everett, Wash.	None.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fernandina, Fla.	None.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galveston, Tex.	3,588	24	0	0	37	61	23	1	0	0	0	0	0	0	0
Halifax, Nova Scotia	3,331	37	0	0	110	147	37	1	1	1	0	0	0	0	0
Honolulu, Hawaii.	2,173	53	0	1	2	56	53	0	0	0	0	0	0	0	0
International Falls, Minn.	447	3	0	1	3	16	2	0	0	0	0	0	1	0	0
Kahului, Hawaii.	None.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ketchikan, Alaska.	315	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key West, Fla.	2,505	2	1	0	0	3	2	0	0	0	0	0	2	1	1
Laredo, Tex.	12,433	19	7	3	88	117	19	5	2	0	0	0	0	0	0
Lethbridge, Alberta, Canada.	634	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malone, N. Y.	1,461	1	0	0	11	11	1	0	0	0	0	0	0	0	0
Marcus, Wash.	701	3	0	1	45	49	2	0	0	0	0	0	0	0	1
Montreal, Canada.	8,537	57	26	1	162	246	45	17	1	3	0	0	0	0	0

TABLE SHOWING NUMBER OF ALIENS INSPECTED AND CERTIFIED, ETC.—Continued.

Stations.	Number of aliens examined.	Number of aliens certified.				Important diseases for which certification was made.											
		Class I.	Class II.	Class III.	Class IV.	Total.	Tra- choma.	Tuber- culosis.	Insan- ity.	Idiocy.	Imbe- cility.	Epi- lepsy.	Feeble mind- edness.	Favus.	Syphi- lis.	Tinea tonsur- ans.	Gonor- rhea.
		Danger- ous, con- tagious.	Insanity and idiocy.	Loath- some.	Likely to become a public charge.												
Naco, Ariz.....	6,893	5	2	12	3	22	5			2			5		12		
New Orleans, La.....	3,231	37	1	0	73	111	33	4									
Newport News, Va.....	1				1												
Newport, Vt.....	420	6	4	0	14	24	2	4	2								
New York, N. Y.....	733,267	1,127	254	159	7,681	9,221	1,083	44	94	7	44	14	95	67	8	48	22
Nogales, Ariz.....	810	0	0	1	7	11	1								2		
Philadelphia, Pa.....	16,257	33	10	4	465	512	33		4		4		2	3	1		
Philippine Islands.....	7,718					22											
Port Townsend, Wash.....	7,589	64	0	0	30	94	64								5		
Ponce, P. R.....	349	0	0	0	1	1											
Port Huron, Mich.....	3,319	7	8	1	31	47	5	2	1			1	4				1
Port Tampa, Fla.....	3,943	0	0	0	15	15											
Quebec, Canada.....	9,047	12	6	1	136	155	11	1	2	1		2	1		1		
Richford, Vt.....	157	0	0	0	0	0											
San Francisco, Cal.....	7,785	526	1	51	311	889	479	514	1								
Savannah, Ga.....	21	0	0	0	1	1											
San Diego, Cal.....	429	0	0	0		0											
San Juan, P. R.....	2,168	0	0	0		0											
Seattle, Wash.....	1,689	24	1	2	4	31	24			1					1	1	
St. John, New Brun- swick.....	3,009	4	2	0	31	37	4		1				1				
Sault Ste. Marie, Mich.....	1,088	4	3	1	43	51	3	1									
Sumas, Wash.....	1,630	66	2	12	4	84	60	6	2						9		3
Tacoma, Wash.....	737	32	2	0	14	48	30	2	2								2
Tampa Bay quaran- tine, Fla.....	3,859	20		1	2	23											
Vancouver, British Columbia.....	3,489	206	5	2	110	323	201	1	5						2	2	
Victoria, British Columbia.....	1,399	1	0	0	15	15											
Winnipeg, Canada.....	6,773	17	1	0	211	229	10	4					1				
Total.....	966,124	2,813	376	302	11,054	14,536	2,586	635	227	18	56	26	117	80	58	52	44

EXCERPTS FROM REPORTS MADE BY SERVICE OFFICERS DETAILED FOR
THE MEDICAL INSPECTION OF IMMIGRANTS.

BALTIMORE, MD.

Passed Asst. Surg. J. W. Schereschewsky, through the medical officer in command, reports that for the two months prior to the end of the fiscal year all cases of eye diseases with clinical symptoms suspicious of trachoma have been examined for the presence of the organism described by Greef in the *Deutsche Medizinische Wochenschrift* of March 25, 1909. This organism was detected in all cases which subsequently proved to be trachoma, but other inflammatory conditions of the conjunctiva gave negative results on examination.

The presence of this organism is therefore of value in making an early diagnosis of trachoma in acute cases, and its detection may be regarded as confirmatory of the diagnosis. The ease, however, with which it disappears under treatment from the surface of the conjunctiva and also the fact that its detection is at all times by no means easy of accomplishment renders its presence an aid rather than a *sine qua non* to the diagnosis of trachoma.

BOSTON, MASS.

Acting Asst. Surg. M. V. Safford, through the medical officer in command, reports the following:

During the past fiscal year 396 ships arrived at Boston bringing passengers liable to medical examination. The aliens thus arriving constituted about 80 per cent of the total passengers. Aboard ship they were mixed with citizens of the United States, as indicated in the following table:

	United States citizens.	Aliens.	Total.
First cabin	4,612	1,259	5,871
Second cabin.....	3,409	8,763	12,172
Steerage.....	3,235	38,065	41,300
Stowaways	28	47	75

Out of the total, therefore, of 48,132 alien passengers arriving at Boston, 2,018 were found on medical examination to be diseased or defective and disabled to such an extent at least as to raise a question as to their capacity for future self-support.

Increasing tendency of aliens to travel second cabin.—Of the aliens thus certified as defective, 1,312 were found in the steerage and 700 in the so-called “second cabin.” Proportionately, therefore, about 3½ per cent of the alien steerage and about 8 per cent of the alien second cabin were found to require medical certification for conditions sufficiently serious to call for consideration in determining the alien’s admissibility. In this connection it may be noted that whereas in 1906 the aliens arriving in the second cabin at Boston were only 10 per cent of the total alien passengers, for the past year the proportion reached 18 per cent.

There is of course a normal tendency to increase in second-cabin travel, but as is indicated by the large proportion of defectives now found in the second cabin, this increase is made up to a considerable extent of people of the steerage type who would normally travel steerage but who are led to pay approximately the difference between \$37 and \$45, or possibly less, for a second-cabin passage, because in so doing they are not subject to the sanitary regulations imposed on steerage passengers originating in districts where serious epidemic diseases are prevailing, and because if diseased or crippled they find less difficulty in securing acceptance for passage by the steamship companies. Then, too, they believe they will find it easier to land as second-cabin passengers upon their arrival. From the point of view of the medical examination it must be admitted that this belief is not groundless. It is becoming more and more difficult to make a proper examination of the type of aliens now arriving in the second cabin, on shipboard in crowded quarters, and mingled with naturalized citizens, as is now the usual practice. Whatever conditions may have once existed for treating aliens traveling in the second cabin differently from those traveling in the steerage such conditions no longer exist.

With passage rates as at present every alien passenger paying less than \$60 for his ocean passage should be removed from shipboard and examined in the same manner as the steerage passengers. The price under which an alien might be regarded as a steerage passenger is set at \$60 not because diseased aliens of the steerage type will find the cost of \$60 prohibitive, but because such an arbitrary standard will insure the proper examination of those who are now paying less and enable the giving of the needed attention to the increasing number of diseased aliens who are already paying more and coming "first-class" to avoid the second-cabin examination.

As to the character of the diseased persons certified during the year, it is to be noted that the steady diminution in the number of those, for the bringing of which \$100 penalties were provided by law in 1903, is still continuing. Improvements in methods of examining and handling prospective passengers at foreign ports of embarkation, and the practice of the steamship lines running to this port in refusing passage to persons presenting any inflammatory condition of the eyelids whatever to avoid the possibility of taking a case which later might prove to be trachoma has had the gratifying result of reducing to an insignificant figure the number of acute inflammatory eye affections of a nontrachomatous nature which it was formerly found necessary to send to hospital for treatment on arrival.

It is unfortunate, however, that all rejections for eye conditions at European ports should have come to be commonly referred to as rejected for trachoma, since this practice has tended to prejudice the prospective passenger's subsequent consideration for passage, given rise to a regular system of extorting money from emigrants under pretense of necessity for medical treatment of their eyes, and enabled steamship companies to work up the semblance of a grievance when a prospective passenger, refused by one line on account of what was merely a transitory inflammation of the eyes, has afterwards been accepted for passage by another line and successfully landed here. As for all practical purposes any inflammatory condition of the eyes may be regarded as contagious and a menace to the health of other

persons in crowded quarters aboard ship, it would greatly help everybody concerned if the embarkation of cases of inflamed eyes from any cause were specifically prohibited by regulation as a sanitary measure just as, for example, cases of measles now are, and independently of the attitude of the Government with respect to trachoma. It is to be observed that under the department ruling, that stowaways were not subject to examination with reference to their admissibility they have not been certified during the year even if found diseased, and diseased aliens of this class are therefore not included in our records.

Hospital cases.—During the year 120 arriving aliens were sent to the various hospitals in Boston, and in addition nearly 600 aliens were treated for less serious ailments or held for observation for varying periods at the station itself. The patients and their relatives and friends are such a nuisance to the ordinary hospital that there is an increasing disinclination on the part of local institutions to accept cases for treatment, and when accepted there is a tendency to try to get rid of them before they are ready to be discharged. To provide suitable care for all cases during the year, it has been found necessary to have recourse to eight different institutions, including the state hospital at Tewksbury, located about 24 miles from Boston. The number of aliens arriving in need of hospital treatment during the year is practically about one-half the average for the preceding four years. The decrease is due chiefly to a noteworthy diminution in cases of measles and other acute eruptive diseases, and also in part to a falling off from the usual number of pneumonia cases originating on shipboard.

Detention station.—The total number of aliens brought to the detention station at long wharf in Boston during the year, including those arrested as being in the United States in violation of law, was 3,910. The health of the inmates of the station has been remarkably good, notwithstanding the fact that a greater proportion than ever before have been detained for periods exceeding six weeks. A new record has also been made, in that no case of contagious disease has developed at the station which can be attributed to infection in the station itself.

Inspection work.—It has been the practice, as in the past, to conduct the examination of arriving aliens, including the medical inspection, on shipboard or in the accommodations provided for the purpose at the five wharf terminals about the harbor used by the principal trans-Atlantic lines. Aliens remaining detained after the primary inspection and one board of special inquiry hearing are brought to the detention station at long wharf in the city proper.

Destruction of terminal.—In July, 1908, the Cunard Line terminal at East Boston was destroyed by fire, and during the remainder of the year it was necessary to make the medical inspection of steerage passengers arriving by that line on shipboard or in improvised quarters in an old freight shed. Under those conditions the proper examination of passengers arriving by Cunard ships during the year was attended with unusual difficulties. A new railroad and wharf terminal at the site of the old pier is now practically completed. In it is provided, for the purpose of the immigration examination of steerage passengers, a well-lighted hall with over 80,000 square feet of floor space fully equipped for this examination and including

provision for the medical examination, which, so far as completeness and convenience of facilities for making such examination is concerned, is probably in advance of anything that has hitherto been designed for work of this character. Adjoining this new Cunard pier work has already begun also on a similar wharf terminal for the use of the larger passenger ships of the International Mercantile Marine, represented here by the White Star, Red Star, and Leyland lines. The result of these projects, already under way, will be to concentrate at East Boston in the future almost the entire trans-Atlantic passenger business of the port. The work of examining arriving passengers will also be further facilitated by the location of the new immigration station at Jeffries Point, in the same vicinity. The purchase by the Government of land at this site is now practically assured, and the construction of the station may be expected to be begun early in the coming year. While it is proposed to arrange the new station so that arriving passengers may be transferred there by water for examination as at Ellis Island, the present practice of examining at the dock where suitable facilities may be provided will undoubtedly be continued.

Commissioner Billings, Deputy Commissioner Hurley, and all other members of the immigration force are to be praised for their uniform courtesy and assistance to the service officers on duty at Boston.

BUFFALO, N. Y.

From the report of Acting Asst. Surg. W. L. Savage, made through the medical officer in charge at Buffalo, the following is taken:

The immigration office at the port of Buffalo, N. Y., is located in the United States custom-house at Black Rock, on the Niagara River, at the American end of the international bridge.

Up to 1901 the immigration work at Buffalo, N. Y., was carried on in a perfunctory manner, and its offices were located in the Federal Building in the city of Buffalo. There was little or no attention paid to immigrants coming to the United States, and only occasionally was the Public Health and Marine-Hospital Service called upon to examine aliens. Such as were examined were detained by the customs officers and the immigration service notified. The chief work of the service at the port of Buffalo prior to 1901 was the looking up of violations of the laws governing alien contract labor.

During the year of the Pan-American Exposition at Buffalo the work assumed a new and more extensive form, and the immigrants coming to the United States were subjected to a rigid examination, both physically and mentally. At this time an extra inspector was placed at Black Rock, and the office removed from the Federal Building to its present location on the banks of the Niagara River, and an officer of the Public Health and Marine-Hospital Service was placed in charge of the medical examination of all immigrants seeking admission to the United States.

At first the work was light. It was not long, however, before the increase of work necessitated the assignment of another immigrant inspector to duty there. The flow of immigration to this country at Black Rock from and through Canada has increased to such an extent during the past eight years that the immigration office force

now numbers 14 persons. Notwithstanding this increase in immigration work there has been no increase in the number of Public Health and Marine-Hospital Service officers detailed to examine the incoming immigrants, the one on duty being obliged to hold himself in readiness at all times, both day and night, to report at the immigration office for the examination of aliens, independent of the regular daily office hours.

Passenger traffic between Canada and the United States has more than tripled itself during the last five or six years, and the number of passenger trains arriving daily has so increased that at the present time there are no less than twenty-three daily, independent of excursion and race trains. Added to this are twenty-four dummies daily, across the international bridge, from 6 a. m. to 12 p. m. The immigration service has care also of the international ferry, which runs between Fort Erie, Canada, and Ferry street, Buffalo, N. Y. It runs every twenty minutes. The steamers plying between Crystal Beach, Canada, and Main street, Buffalo, N. Y., also fall under their inspection.

To this has been added the examination and deportation of aliens who have become public charges in any of the local hospitals, county hospitals, and poorhouses for physical or mental conditions existing prior or subsequent to their arrival in the United States. Alien insane cases are also examined and reported. In all cases their physical and mental condition has to be certified to by the officer of the Public Health and Marine-Hospital Service in charge of that work.

The care and examination of Chinamen smuggled into this country and later caught by the Chinese inspectors, as well as the examination of those who have a legal right to return to the United States, after a visit to China, also falls to the medical examiner.

The abolition of the "white slave" traffic has of late occupied the attention of the Department of Commerce and Labor, and special immigrant inspectors have been appointed to investigate the existing conditions. The victims of this traffic when arrested are confined in the county jail where they are held either as witnesses or for deportation. Their care also falls to the medical examiner.

BROWNSVILLE, TEX.

Acting Asst. Surg. G. D. Fairbanks reports that the number of aliens entering at Brownsville, Tex., has greatly increased over that of last year.

The noted increase is due to the extraordinary development which is going on by which ample work is provided for large numbers of laborers, and the outlook at present is for its continuation, particularly in view of the international railroad bridge, which is now being constructed across the Rio Grande at Brownsville. This bridge will also probably change the character of immigrants arriving and increase the number of aliens other than Mexican.

The section of Mexico adjoining Brownsville seems to be particularly infected with trachoma, but it is also noticed that people from the ranches and the interior, outside of the cities and towns, are seldom seen with the disease. Another very prevalent affection of the eyes is pterygium, which is noticed in extraordinary degree.

DETROIT, MICH.

Acting Asst. Surg. A. H. Wise reports, through the medical officer in command, that during the past year the class of aliens arriving at this port has changed decidedly. Aliens, principally Bulgarians coming from southeastern Europe and Asia Minor, generally after a short stay of from one to twelve months in Canada, were frequently encountered during the first few months of the fiscal year. Yet, in spite of the fact that the number of monthly inspections has grown greater, this class of immigrant has, in a great measure, ceased to come, the great majority being English-speaking peoples. Possibly this accounts for the marked decrease in the number of certifications of trachoma, for since January the trachoma cases have averaged only 3 per month, while previous to that time they averaged 14 per month.

EAGLE PASS, TEX.

From the report of Acting Asst. Surg. Lea Hume it appears that the principal diseases for which aliens are certified at Eagle Pass, Tex., are those of the first and fourth class. Trachoma is the cause for the largest number of rejections, and is found principally among Syrians who land in Mexico from Marseille. Mexicans are seldom found suffering from trachoma.

EL PASO, TEX.

Acting Asst. Surg. J. W. Tappan reports that alien immigration, other than Mexican laborers, has decreased at El Paso during the past two years. Whether this is due to the recently instituted inspection of immigrants by the Mexican authorities (who are now excluding diseases likely to affect the alien's ability to earn a living) or to the general depression in immigration, it is hard to determine.

During the year a tour of inspection of the immigrant stations along the Texas-Mexican and Arizona-Mexican borders was made by Acting Assistant Surgeon Tappan, at the request of the Commissioner-General of Immigration, through the bureau. The medical inspection of arriving aliens was found much improved over previous years and trachoma, favus, and tuberculosis in arriving aliens were found to be on the decrease. Medical officers were instructed in the methods which prevail at Ellis Island for the medical inspection of aliens and arrangements were made at each station to render the inspection as nearly uniform for the whole border as possible. In this effort valuable assistance from the supervising inspector of immigration for the border was received, without whose active cooperation in medical affairs the good results already accomplished could not have been attained.

EASTPORT, IDAHO.

Acting Asst. Surg. N. L. Slamberg reports that the immigration at Eastport, Idaho, has been steadily increasing, more than double the number of immigrants presenting themselves for examination during the later months of the year than was the case during the first months.

A certain proportion of the immigrants were found to be persons who had more or less recently undergone a medical examination at some Canadian port of entry, and the great majority consisted of strong young men and women in search of work. While the limited number presenting themselves daily allowed time for a more thorough examination than would be possible where hundreds had to be examined at one time, the percentage of certifications was not large.

Besides the regular work at the office, trips of inspection have been made from time to time down the Spokane and International Railroad, with a view of observing those passengers who board the train shortly after its entrance into the United States. For persons familiar with the country it would be quite feasible to cross the boundary line at a point remote from the immigration station, and while so far no suspicious cases have been observed, it is believed that the fact of the small stations being even occasionally watched, will, to some extent, serve the purpose of preventing illegal immigration.

MONTREAL, CANADA.

From the report of Passed Asst. Surg. E. H. Mullan, the following is taken: The Public Health and Marine-Hospital Service assumed charge of the medical inspection of immigrants bound for the United States, at Montreal, on September 30, 1908. Since that date the passengers who are presented for medical inspection are examined at the immigration office by the service officer daily.

For every case inspected the service officer signs a blank form, certifying that the alien is either free from the disease or that he is afflicted with a certain condition. All deformities and diseases are noted on these forms. To the certificates bearing the words trachoma or pulmonary tuberculosis, the words "a dangerous, contagious disease," are added. Certificates of other serious conditions contain the name of the disease or deformity, immediately after which are inserted the words "affecting ability to earn a living." Minor defects which do not hinder the alien in earning his livelihood are simply mentioned on the same blank certificate form, after which the word "Record" is written.

The list of records comprises principally slight deformities, pregnancy, skin diseases, and visual defects.

The board of special inquiry gives great weight to the certificates bearing the words "affecting ability to earn a living," issued by this office. The medical officer is frequently called before the board of special inquiry to supplement the certificates with statements which tend to show the degree of seriousness of the maladies certified to.

NEW YORK (ELLIS ISLAND IMMIGRATION STATION).

Surg. George W. Stoner, chief medical officer, reports the following:

Seven hundred and thirty-three thousand two hundred and sixty-seven aliens were examined upon arrival, including 133,350 cabin and 599,917 steerage passengers.

In addition to the above there were 135,181 cabin and 34,639 steerage passengers, who, upon further examination by the immigrant inspectors, proved to be citizens of the United States.

Nine thousand one hundred and twenty-one aliens were certified for physical or mental defects, as per tabulated statement herewith, including 1,286 classified as dangerous contagious or loathsome contagious, viz, trachoma, 1,083; favus, 67; tinea tonsurans, 49; tuberculosis, 44; syphilis, 8; gonorrhea, 22, and chancroids or ulcer, 13; and 261 mentally diseased or defective, viz, insane, 94; idiots, 7; epilepsy, 14; imbecile, 44; feeble-minded, 95; mentally retarded, 3; and mental instability, 4.

Eight thousand three hundred and twenty-two arriving immigrant aliens were admitted to hospitals as follows:

Immigrant Hospital, Ellis Island, N. Y.....	6,186
Health Department Hospital, New York City, N. Y.....	1,166
St. Mary's Hospital, Hoboken, N. J.....	750
Long Island College Hospital, Brooklyn, N. Y.....	96
St. Vincent's Hospital, New York City, N. Y.....	73
Columbus Hospital, New York City, N. Y.....	51
Total	8,322

One hundred and sixty-one aliens were on hand at the different hospitals at the beginning of the fiscal year, making a grand total of 8,483, including 3,940 men, 2,117 women, and 2,426 children, furnished hospital care and treatment.

Forty-one men, 10 women, and 116 children, total 167, died in hospital during the year.

Fourteen children (8 male and 6 female) were born.

Of the number admitted to hospitals of the New York City health department and St. Mary's Hospital, Hoboken, N. J., 1,241 were suffering from acute contagious disease, including: Measles, 831; scarlet fever, 132; chicken pox, 126; erysipelas, 64; diphtheria, 37; mumps, 26; cerebro-spinal fever, 10; whooping cough, 9; and small-pox, 6.

The number of aliens admitted to immigrant hospital include the 94 certified insane on arrival and 8 whose mental condition had not been definitely determined at the date of this report, June 30, but who have since been certified insane.

The immigrant hospital admissions also include 218 warrant (landed) cases returned to Ellis Island for deportation, and among these there were 98 insane, making a total of 200 insane aliens furnished temporary hospital care and treatment during the fiscal year. (See tabulated statement.)

The new Contagious Disease Hospital, Ellis Island, N. Y., and the new wing to the immigrant (general) hospital not being ready for the reception of patients July 1, 1909, contracts with the New York City health department hospital and St. Mary's Hospital, Hoboken, N. J., for the care and treatment of arriving alien immigrants suffering from acute contagious diseases are being continued; also the contracts with the Long Island College Hospital, Brooklyn, N. Y., St. Vincent's Hospital, and Columbus Hospital, New York City, for care and treatment for such arriving aliens as may be sent to them.

Summary of hospital transactions, fiscal year ending June 30, 1909.

Patients in hospital at beginning of year.....	161
Patients admitted to hospital during year.....	8,322
Total treated (men, 3,940; women, 2,117; male children, 1,279; female children, 1,147)	8,483

Births (male, 8; female, 6)-----	14
Deaths (men, 41; women, 10; male children, 70; female children, 46)---	167
Pay patients treated during the year-----	8, 028
Free patients treated during the year-----	455
Days treatment for pay patients-----	93, 343
Days treatment for free patients-----	6, 550
Total days treatment for hospital cases-----	99, 893
Daily average number of patients in hospital-----	273
Patients in hospital at end of year-----	279

Hospital.	From pre- vious year.	Ad- mitted during year.	Total treated.	Recov- ered.	Im- proved.	Not im- proved.	Died.	Re- main- ing at end of year.	Days treat- ment.
Immigrant.....	91	6, 186	6, 277	2, 828	1, 414	1, 860	32	143	53, 721
Health Department.....	36	1, 166	1, 202	1, 050	-----	1	80	71	35, 076
St. Mary's.....	30	750	780	661	7	16	37	60	17, 568
Long Island College.....	-----	96	96	74	4	3	13	2	1, 525
St. Vincent's.....	2	73	75	56	3	9	5	1	1, 126
Columbus.....	2	51	53	47	2	2	-----	2	877
Total.....	161	8, 322	8, 483	4, 716	1, 430	1, 891	167	279	109, 893

SAN FRANCISCO, CAL.

The statistical report for San Francisco, given elsewhere, shows 7,785 immigrants examined, but this number does not give adequate information as to the number actually examined at the station. Passed Asst. Surg. W. W. King reports that there were examined, besides the number given above, 2,733 passengers, mostly Chinese, who were landed as American citizens, being natives, sons of natives, etc. Of this number 384 were certified for various causes. There were also 8,556 alien members of ships' crews examined, making a grand total of 19,074. Reexaminations, examinations for age, and other purposes are not included in this total.

Immigrants who are certified as suffering from trachoma are generally brought by the Commissioner of Immigration before a medical board of inquiry, in accordance with paragraph 811 of the Service Regulations. During the year 420 immigrants were examined by this board and the diagnosis was confirmed in all cases but one.

The rulings of the circuit courts of appeals that aliens having become domiciled in the United States and returning from visits abroad could not be deported for medical cause on their return became operative during this fiscal year. Thus many Chinese returning to the United States have been landed, whereas formerly they would have been deported. It has resulted in an increase in the number landed and a corresponding decrease in the number deported.

The examination of Chinese applicants as to their age has grown to be an important feature of the work of the medical examiner at San Francisco, owing to the time required to make the numerous trips to the Pacific Mail dock or the detention shed for this purpose. During the year there were 194 such examinations made, necessitating probably one-third that many trips for this particular duty.

Other visits have been made to the various hospitals where there were immigrants who had been permitted to land for hospital treatment. Also to the Alameda County jail, Oakland, to examine aliens under arrest who complained of being ill and in need of removal to a hospital.

SEATTLE, WASH.

Passed Asst. Surg. M. W. Glover reports that at Seattle the arriving aliens have decreased in number from one-half to one-fourth since June of last year, that being synchronous with the time the Japanese Government enforced the rule of giving passports only to others than the labor class. At the present time the average number arriving on any one steamer is about 50. The great majority are Japanese, East Indians and Europeans making up about 10 per cent of the total.

As a class the aliens are a clean, orderly set, appearing for medical inspection in new clothes and clean faces. In fact, the medical inspection at times is delayed for the many last touches to the toilet.

Almost without exception no loathsome or contagious skin diseases are observed. Frail physique is a rarity, the immigrant class being recruited, apparently, from an unmixed blood and not far distant from the soil. Only one case of alcoholism was noted, and the evidence of more moderate drinking is gratifyingly absent. Trachoma is the most prevalent of all diseases. This is only in a subacute form, and is increased in severity by the wind and sun of the passage and, perhaps, the close contact in quarters of the vessel. All cases of inflamed lids are held for further medical examination, a certificate not being issued for a week or ten days after arriving. Some mild form of treatment is instituted meanwhile, such as zinc solution in the morning and silver solution at night; in the meantime the endeavor is made to place the alien under the best hygienic surroundings in the detention house.

In most cases of arriving aliens, when a case has been certified, a request for hospital treatment is made, and in two or three months the condition has cleared up and the alien admitted.

Quite a number of cases of trachoma among "arrest" cases coming from across the border from Canada have been found. These have in not a few instances been released by department orders. This I find is due to the fact that the Canadian authorities have refused readmission to the arrests, they not having been long enough in Canada to secure citizenship.

A total of 30 new eye cases have been held for further medical observation for a period of from three to ten days, in which, by simple application, the membrane cleared up and a suspicious case of trachoma resolved itself into a noninfectious conjunctivitis.

THE MEDICAL INSPECTION OF IMMIGRANTS WHO HAVE BECOME PUBLIC CHARGES IN VARIOUS STATE OR MUNICIPAL INSTITUTIONS.

New York, N. Y.—The medical officer reports that state or local medical certificates in the cases of 493 alien immigrants who had become public charges in various state or municipal institutions or dependent upon private charity were referred to his office by the Commissioner of Immigration with request for examination and certificate by medical officers of the service; accordingly visits were made to the various institutions and certificates in each case were rendered for the information of the commissioner.

During the last two months of the fiscal year there were not so many public charge cases examined by medical officers of the service as formerly. The reason is that the procedure in such cases has been

changed, so that the data which is now supplied by the state and municipal officers is in most cases in such form as to afford sufficient evidence to justify the department in taking action.

Philadelphia, Pa.—Investigation was made of 391 aliens who had become public charges in various state or municipal institutions, said investigations resulting in the deportation of 39 aliens.

Eighteen cases of insanity were certified as due to causes existing prior to landing. This does not mean that these people were insane at the time of arrival, nor could it be foreseen that they would become so at that time, but that they were victims of the influence of change of environment operating on a defective heredity.

Boston, Mass.—During the fiscal year 392 cases were referred to the Boston office for action, 278 from institutions in Massachusetts, and 114 from other States.

San Francisco, Cal.—Forty-two visits were made to hospitals, hotels, and jails for the purpose of inspecting aliens who had become public charges from causes either prior or subsequent to landing.

All of these visits were within the corporate limits of San Francisco and Oakland.

Chicago, Ill.—Investigation was made of 93 aliens, of which number 82 were recommended for deportation. The inspection of these 93 aliens involved the making of 79 trips, aggregating 3,000 miles of travel. Among the cities visited were Springfield, Jacksonville, and Elgin, Ill., Gary and Logansport, Ind., and Mendota and Wauwatosa, Wis.

Baltimore, Md.—The medical officer reports that few requests are made by the commissioner of immigration at Baltimore for the examination of aliens who have been found to be public charges in the various city and state institutions.

This is owing to the fact that only about 10 per cent of the aliens arriving at the port of Baltimore remain in the State, and also perhaps to the somewhat superior physical average of those who actually do remain. Only 9 aliens were reported during the year as public charges by the various institutions of this State and city. Of this number 6 were certified.

New Orleans, La.—Six aliens were examined during the year at public institutions, with the result that 3 were certified.

FOREIGN PORTS.

CHINA—Amoy.—Asst. Surg. A. D. Foster reports the inspection of 1,208 steerage passengers destined for Philippine ports, of which 31 were rejected, 25 for trachoma.

Hongkong.—Acting Asst. Surg. J. Spencer Hough reports that during the fiscal year 8,678 aliens destined for the Pacific coast of the United States and Honolulu were inspected, of whom 2,353 were advised to be rejected.

Shanghai.—Acting Asst. Surg. S. A. Ransom reports the inspection of 49 immigrants, of which number 49 were advised to be rejected, 4 for trachoma.

JAPAN—Kobe.—Acting Asst. Surg. C. P. Knight reports 2,718 aliens inspected, of which 917 were recommended for rejection.

Yokohama.—Passed Asst. Surg. Hugh S. Cumming reports the inspection of 1,748 aliens, of whom 65 were rejected, of which number 61 were for trachoma.

NAPLES, ITALY, AND SUBPORTS MESSINA, PALERMO, AND GENOA.

Asst. Surg. R. A. C. Wollenberg reports the following transactions for the fiscal year ended June 30, 1909:

STATISTICS OF ALIENS EXAMINED AT NAPLES, MESSINA, PALERMO, AND GENOA.

Months.	Number of emigrants.			
	Naples.	Messina.	Palermo.	Genoa.
1908.				
July.....	1,989	52	257	.....
August.....	5,269	.....	215	.....
September.....	4,031	.....	714	.....
October.....	5,873	.....	524	.....
November.....	7,116	.....	657	.....
December.....	5,987	113	977	.....
1909.				
January.....	13,996	.....	1,296	1,259
February.....	21,565	.....	2,487	.....
March.....	40,865	.....	4,758	2,979
April.....	32,278	.....	4,185	1,531
May.....	26,385	.....	1,852	.....
June.....	12,784	.....	1,002	.....
Total.....	176,158	165	18,924	5,769

REJECTIONS RECOMMENDED.

Months.	Tra- choma.	Favus.	Suspected trachoma.	Suspected favus.	Measles.	Small- pox.	Other causes.	Total.
1908.								
July.....	100	2	53	.....	.....	.....	15	170
August.....	124	1	69	1	.....	.....	17	212
September.....	172	3	76	.....	.....	.....	20	271
October.....	241	17	122	2	2	1	51	436
November.....	270	14	166	2	.....	.....	28	480
December.....	209	4	112	3	2	.....	49	379
1909.								
January.....	459	24	270	7	.....	1	88	849
February.....	526	86	324	7	.....	.....	135	1,078
March.....	995	89	705	8	4	.....	316	2,117
April.....	949	100	554	10	4	1	310	1,928
May.....	794	95	490	9	.....	1	278	1,667
June.....	386	31	282	4	1	2	135	841
Total.....	5,225	466	3,223	53	13	6	1,442	10,428

During the past year there has been a notable increase in number of emigrants inspected at Naples by the service, as is shown from the following table:

Year.	Number of emigrants inspected.	Number of emigrants embarked.	Baggage—		Rejections recom- mended.
			Disin- fected.	Passed.	
1907-8.....	121,897	114,673	141,653	38,879	7,224
1908-9.....	211,424	200,996	238,365	41,139	10,428

The following officers of the service were stationed in Italy during the past year:

Naples.—Asst. Surg. R. A. C. Wollenberg, Acting Asst. Surg. Enrico Buonocore, Acting Asst. Surg. Frederico Reale, Clerk R. D. St. Leger.

Palermo.—Acting Asst. Surg. Ignazio Di Bartolo.

Messina.—Acting Asst. Surg. Sebastiano Tornatola.

The services of Doctor Tornatola were discontinued on February 1, 1909, on account of the destruction of the city of Messina by the earthquake of December 28, 1908, when it ceased to be a port of emigration.

Methods.

At Naples all physicians employed by the steamship companies for the vaccination of emigrants perform this work under the supervision of the service.

There are, further, under service direction, eight "inspectors," who are engaged in the inspection, disinfection, and labeling of steerage baggage, the stamping of labels and inspection cards, and the examination of cards in conjunction with a supplemental medical inspection held on the ship's gangway.

The examination of emigrants and the inspection and disinfection of baggage is done as heretofore. During the year 41,139 pieces of baggage were inspected, and 238,365 pieces were disinfected and labeled accordingly. The building for the disinfection of baggage is large and well kept. It is divided into two parts—the "clean" and the "unclean" sides, and is furnished with two pressure steam disinfecting chambers and a room for formaldehyde and sulphur disinfection. The effects of the emigrants are brought for disinfection usually on the morning of the sailing of the vessel. All baggage from the Levant, from smallpox-infected Italian provinces, and all that which is soiled or worn is subjected to thorough disinfection. New or clean articles from noninfected Italian provinces are passed. Immediately following these operations proper labels are affixed, and all pieces are taken to the wharf, a short distance away, and deposited to await the owners, or else immediately placed on board.

On the morning of departure, or on the previous day, the emigrants are vaccinated in rooms furnished by the steamship companies. At hours fixed by the chief inspector of emigration the emigrants appear at the "capitaneria" to receive the necessary inspection. The "capitaneria" is a building for customs, emigration, and other officers. In a large, fairly well-lighted and ventilated room, the emigrants are placed in line, and are inspected by the service officers in the presence of the Italian emigration commission. This commission consists of an emigration officer, a port medical officer, a royal commissioner, and certain police officials.

The service inspection is intended to conform to the requirements of the United States immigration laws and regulations and also with the United States quarantine laws and regulations. Each line of emigrants is examined by two service officers; one examines for diseases of the eye, especially trachoma, while the other searches for favus and such other diseases and conditions as might be causes for rejection upon arrival in the United States. Emigrants recommended for rejection have their tickets and inspection cards taken up, and are turned back to the emigration, port, or steamship officials. If the cause of rejection is apparently of a temporary nature they are advised that they may again present themselves for examination.

No one is ever denied an examination. Minor ailments and deformities are always pointed out, and aliens presenting such disabilities are transported, if at all, at the risk of the steamship companies. Following the medical inspection the cards are stamped with the service seal.

Passports, which are required to be in possession of all emigrants, are then examined by the police. After the passports are inspected the emigrants enter the wharf, gather their belongings, and prepare to board the ship. They receive, however, another inspection at the gangway. At this point the eyes and scalp are reexamined by a physician in the company's employ, and inspection cards are viséed, as before stated. This gangway examination is a valuable protection against fraudulent embarkation and against evasion of the regular inspection.

Deceptions.

Notwithstanding all efforts directed against clandestine embarkations, such cases still occur from time to time.

Ships from Naples carry a notoriously large number of stowaways. There appear occasionally citizens of the United States with American passports giving the names of persons to whom they are issued and the words "accompanied by two minor children," as the case may be. These passports may be, and undoubtedly have been, used illegally, as alien children afflicted with disease may be substituted here and be carried into the United States under such protection. This might be remedied by inscribing on the passport the name and description of each accompanying person. Smuggling diseased persons aboard is conducted by an organized band, it is said. With confederates employed on the ships the swindlers ply their business more or less freely outside the regular inspection hours. They extort a considerable sum of money from gullible emigrants. If the latter be successfully embarked they finally find themselves deported from America and returned to Italy after a great loss of time and funds, besides being a danger to other passengers, and causing a loss to the steamship companies in the way of fines and return passage. One ruse is to smuggle a diseased person on board, then to pass a sound person through the line of examination, who afterwards leaves the ship, having turned the cards over to the hidden owner, who appears as a regularly listed passenger after the ship clears; or, after boarding in the same manner, the emigrant may be handed a card stamped with a forged service seal.

The erection of a proper emigration building like that at Hamburg, for instance, would obviate most of this trouble. This could be done by the steamship companies, and with such great emigration as there is from the port of Naples it is an urgent necessity. Recommendations along this line have not met with much support for the reason that steamship companies will not cooperate.

No cases have been observed where diseased aliens have been embarked by accredited steamship officials for the purpose of defrauding the United States Government.

Further methods.

After the earthquake at Messina there was a temporary change in the place of examination, due to the fact that all available space

in the "capitaneria" was occupied by supplies being forwarded to the stricken districts. For several weeks the examination was done on the wharf alongside the ship, and the work went along without trouble or confusion. A considerable number of refugees were examined in the consulate, at the request of the consul, preliminary to their embarkation to the United States.

Emigrants from Palermo who sail by way of Naples are inspected on board at their arrival.

Vessels for the United States requiring supplemental bills of health from Naples receive such inspection and certification as may be necessary.

Daily visits, involving the inspection of 3,577 persons, were made to boarding-houses wherein were held for observation all emigrants coming from foreign countries and districts where quarantinable diseases prevailed. The period of observation usually extended from two to three days, or what, with the time en route to Naples, would complete a quarantine period determined by the United States quarantine regulations. The temperature of each individual was regularly taken. No quarantinable disease was discovered. However, 20 persons were isolated on account of fever and intestinal disturbances and 14 for whooping cough. Two hundred and eighty-nine cases of trachoma, 2 cases of favus, 2 cases of tuberculosis, and several deformed persons were found and informed that their embarkation would be prohibited. Forty-four smallpox contacts and 3 plague contacts were held under observation for the required length of time.

These visits were conducted chiefly by Doctor Buonocore. This service was most highly appreciated by the local health office at Naples, and was the subject of much favorable comment. Copies of weekly sanitary reports and other sanitary information of interest kindly furnished from various consulates, such as those at Constantinople, Damascus, Smyrna, Samsoun, Trebizond, Athens, Odessa, and Alexandria, were of great assistance to the service officers at Naples in the execution of this important work.

On December 9, 1908, it was recommended to Mr. J. A. Smith, consul-general at Genoa, that emigrants from that port be vaccinated. There had been some smallpox in Genoa, and a rather violent epidemic had been reported in the province of Ferrara. The recommendation was promptly acted upon. Four visits were made during the year to Genoa by the officers at Naples for the purpose of examining emigrants sailing directly from Genoa to the United States. The examinations were conducted in a manner similar to that in vogue at Naples. The vaccination of emigrants was regularly and properly done. Baggage from southern Italy was disinfected at Naples prior to shipment by steamer to Genoa. The necessary disinfection of baggage from northern Italy was done in steam chambers aboard ships, as no apparatus was at hand on the wharf. All possible assistance and courtesy was rendered by the consul-general, port officials, and steamship company officers, by whom the work seemed to be much appreciated.

Smallpox in Naples, introduced from Marseille June 13, 1908, continued as a mild epidemic throughout the whole year, with a total number of 732 cases and 112 deaths. Of those attacked the oldest was aged 64 years, the youngest 13 days. Six cases were discovered among emigrants at the examination prior to embarkation, and were sent

to the Cotugno Hospital for contagious diseases. All contacts were held under our observation for two weeks, but no further cases appeared. Several cases of smallpox were found at the Palermo examinations.

Paragraph 34, Quarantine Regulations, referring to crews, was complied with for the greater portion of the year.

Sanitary conditions.

The general sanitary condition of Naples during the fiscal year was fair. It was considerably improved in June by the abolishing of the time-honored custom of driving cows and goats about the streets at all hours, to be milked at the customers' doors. Narrow streets and sidewalks have often been made almost impassable by the manure deposited by these itinerant animals. Though this method of milk distribution insured a fresh supply, the quality was seldom good. Registered milk animals to the number of 2,291 cows and 2,768 goats are now permitted on the streets only during the two hours from 7 until 9 a. m. The city health department of Naples now conducts a strict supervision over all dairies and stables. The spread of infectious disease by milk seems, however, to be of rare occurrence, the latter being customarily boiled before consumption.

Restraint of emigration.

Italian emigration for the United States reached its maximum in March. The decline commenced earlier than in past years, when the spring rush usually continued until June. The cause of the sharp decline in May may be partly attributed to the restraining efforts of the Italian commission of emigration. The following circular letter, which caused much comment, was widely distributed throughout the country districts and was undoubtedly effective.

[Translation.]

COMMISSION OF EMIGRATION,
April 10, 1909.

During the first three months of this year more than 100,000 Italians emigrated to the United States. This number is much larger than any other for the past years.

From the American Confederation each day news arrives that there is a considerable excess of workmen over those wanted; therefore a good number of those who are already there find themselves without occupation and in bad circumstances. Work in general will be taken up again only when a good many serious questions are straightened, among which the customs tariff is the most important.

It is in their most vital interest that the commission of emigration dissuade our emigrants from leaving in a great number for the United States, where they would only make the condition worse for those already gone, and at the same time would expose themselves to a great loss.

The commission of emigration trusts to have in this work of advertisement the truest and sincerest cooperation of all the authorities, newspapers, of all social parties, and of everyone who is interested in our emigration.

Sent to: The provincial and communal authorities, the institutions of protection for emigrants, and the newspapers.

Emigration—Statistical.

From time to time letters, pamphlets, and news articles are published throughout the Kingdom concerning foreign, economic, and

industrial conditions for the benefit of emigrants, the Government being most solicitous as to their welfare.

The total emigration for the United States includes the number leaving by northern European ports and those leaving from the Italian ports of Naples, Genoa, Messina, and Palermo. The director-general of statistics publishes interesting information concerning the movement for the calendar years 1907 and 1908:

TOTAL NUMBER PASSPORTS ISSUED.

	1907.	1908.
For European countries and Mediterranean regions.....	288,744	248,101
For transoceanic countries.....	415,901	238,573

PASSPORTS FOR TRANSOCEANIC COUNTRIES.

United States.....	298,124	131,501
Canada.....	10,436	5,988
Central America.....	2,122	723
Brazil.....	21,298	15,558
Argentine.....	78,493	80,699
Uruguay.....	1,650	1,874

There was a diminution of Italian emigration for the European States of Germany, Switzerland, Austria, and France to the number of 35,467.

Diminution of total emigration was noted during 1908, especially from Abruzzo and Molise, Campania, Basilicata, Calabria, and Sicily.

Emigration from Venetia, Lombardy, Piedmont, Emilia, Tuscany, and Umbria was mostly for European States. Emigration from Marches, Liguria, Latium, southern Italy, and Sardinia was for transoceanic countries.

Emigration by sex and age for 1908.

	Per cent.
Male emigrants.....	82.7
Males under 15 years.....	7.6

Of the total number of male emigrants only 18.7 per cent were accompanied by families.

Emigration by occupation for 1908.

Ordinary laborers.....	139,488
Farm laborers.....	138,969
Skilled laborers.....	107,348

Leprosy is present in Italy chiefly in Apulia and Sicily. Perhaps the greater number of cases have been imported from Brazil by returning emigrants. There are no laws in force concerning the disease.

The following table, compiled from the monthly sanitary bulletins of the bureau of health, gives the total number of cases of the diseases reported in Italy for the year 1908:

	Smallpox.	Typhus.	Malaria.	Pellagra.	Anthrax.
January.....	525	0	5,518	198	137
February.....	539	0	4,245	142	116
March.....	396	0	4,996	241	104
April.....	407	0	5,665	289	93
May.....	477	0	8,766	463	126
June.....	309	0	13,250	447	338
July.....	397	1	28,699	368	466
August.....	417	0	35,321	247	643
September.....	167	1	30,618	125	710
October.....	169	1	20,313	134	442
November.....	204	0	10,043	98	213
December.....	310	0	5,428	76	180
Total.....	4,317	3	172,862	2,828	3,568

Population of Italy, census of 1901, 32,475,253.

SANITARY REPORTS AND STATISTICS.

FOREIGN.

Through the Division of Sanitary Reports and Statistics the bureau has kept informed in regard to: (1) The existence and prevalence of the quarantinable diseases—cholera, leprosy, plague, smallpox, typhus fever, and yellow fever—throughout the world; (2) the nature and scope of the sanitary measures taken by foreign countries to prevent the introduction of or to eradicate these diseases, and the results of their application; (3) the unusual virulence or prevalence of disease which might in any way have a bearing on the public health of the United States; (4) the nature and effect of general public-health measures adopted by other countries.

This information is obtained through the International Sanitary Bureau of American Republics at Washington, the International Office of Public Hygiene at Paris, the officers of the Public Health and Marine-Hospital Service, the American consuls, and from health officers and sanitary officials. The information thus acquired, with the exception of that of a confidential nature, is published weekly in the Public Health Reports in a form convenient for reference. The matter as published shows where throughout the world dangerous contagious diseases are present. It shows the course of epidemics. If they are spreading, it indicates the involvement of new territory; if subsiding, the places where they no longer exist. The effect of sanitary measures is likewise made apparent. This makes the reports of special value to all officers, federal and local, connected with maritime quarantines, and, in fact, a necessity for the proper and efficient execution of their duties.

DOMESTIC.

In the United States cognizance has been taken of sanitary conditions, needs, and progress, with special attention to matters which, being interstate in nature and national in scope, could not be undertaken by local health authorities. Special attention has been given to the diseases directly or indirectly contagious. Morbidity statistics showing their distribution and prevalence have been carefully compiled. Special consideration has been given to the public-health problems created by the local or general prevalence of tuberculosis, typhoid fever, pellagra, hookworm disease, and plague. Information in regard to these subjects, as well as the other matters referred to, has been published from time to time in the Public Health Reports for distribution to health officers in the localities most interested.

The statistics gathered and published by the bureau relating to the United States are those pertaining to any special epidemic disease that may be prevailing, such as smallpox, and the number of cases and deaths from tuberculosis, typhoid fever, scarlet fever, diphtheria,

measles, and whooping cough. Recently there have been added to this list statistics of cases and deaths of pellagra, hookworm disease, leprosy, rabies, and tetanus.

Heretofore this information has been obtained from some 284 cities, all having a population greater than 10,000, but lately requests and blank forms have been sent to some 6,500 additional cities, towns, and counties, reports from which are now being received. These statistics are gathered for the most part weekly, and are published in the Public Health Reports. Some cities and towns, however, can not give weekly statistics, and in these cases monthly reports are received and published.

By these means information as to the prevalence of disease is communicated to health officers throughout the United States each week. The same plan is adopted with regard to information from foreign countries and our insular possessions, excepting that the tables containing statistics from foreign cities do not include the five additional diseases which have been added to the domestic list.

Additional information concerning diseases particularly prevalent, or of a special interest, such as smallpox or rabies, is received through a press clipping bureau, with the practical end in view of mailing to the health authorities of the places indicated by the clippings the bureau pamphlets relating to these special diseases.

A summary of the statistics, both domestic and foreign, relating to four of the principal epidemic diseases is, in accordance with the custom, submitted herewith.

SMALLPOX IN THE UNITED STATES—STATISTICAL.

In the United States, 42 States, 1 Territory, and the District of Columbia reported 24,657 cases of smallpox, with 75 deaths, being 6,543 cases and 6 deaths less than reported for the fiscal year 1908.

During the fiscal year 1902 there were reported 55,857 cases, with 1,852 deaths. Since then the number of cases and deaths has gradually diminished.

The number of cases reported in 1909 was therefore a little less than half of that of 1902, whereas the number of deaths was approximately one-twenty-fifth as great. The marked decrease in the mortality of the disease is of the greatest interest and importance. It means that while there are many cases of smallpox occurring at present in various parts of the United States, but few are fatal. The disease has assumed a very mild form, less serious in its results than many of the commoner diseases which usually attract little attention.

The conclusion must not be drawn, however, that the disease has lost its importance from a public health standpoint, for at times in isolated outbreaks it takes on a virulent form with a high death rate, meriting all the dread with which communities have been accustomed to look upon it. The cause of this occasional change from a mild to a highly fatal disease is not known, nor can it be foretold whether the general mild type existing at present may not at some time change to the more usual fatal form.

Since the end of the fiscal year, that is, from July 1 to November 30, 1909, only 5,499 cases have been reported, and of these but 27 were fatal. This shows further improvement.

The States reporting the greatest number of cases of smallpox were Minnesota, Kansas, Ohio, Illinois, Indiana, Wisconsin, Utah, North Carolina, Iowa, and Michigan.

The cities reporting the greatest number of cases were, in Minnesota, St. Paul, Duluth, and Minneapolis; in Kansas, Pittsburg, Kansas City, Parsons, Topeka, and Wichita; in Iowa, Dubuque, Council Bluffs, and Cedar Rapids; in Ohio, Cincinnati, Plain City, and Hillsboro; in Illinois, Cairo, Peoria, Danville, Browning, and Murphysboro; in Wisconsin, Milwaukee, La Crosse, Manitowoc, and Sheboygan; in Utah, Salt Lake City; in Michigan, Saginaw, Battle Creek, and Lansing; in Montana, Bozeman and Butte; in California, San Francisco, Sacramento, and Stockton; in Texas, San Antonio, Fort Worth, and Encinal; in Colorado, Denver; in Georgia, Atlanta and Macon; in New York, Middleburg, Broome, Amsterdam, and Cortland; in Missouri, Kirksville, St. Louis, St. Joseph, and Kansas City; in Washington, Spokane, Tacoma, and Seattle; in Louisiana, New Orleans; in South Carolina, Yorkville and vicinity; in Alabama, Huntsville and Mobile; in Arkansas, Allbrook and Little Rock; in Tennessee, Memphis, Nashville, and Knoxville; in Nebraska, Lincoln and South Omaha; and in Vermont, Lithia, Brattleboro, and East Dover.

From October to May there was an outbreak in Maine, along the Canadian border, the greatest prevalence being at Van Buren; and in the latter half of the fiscal year an outbreak in New Jersey, the principal cities visited being Perth Amboy, Camden, and New Brunswick.

In Porto Rico 8 cases were reported at Mayaguez, and in the Philippine Islands 285 cases, with 88 deaths at Manila.

SMALLPOX IN FOREIGN COUNTRIES—STATISTICAL.

In Cuba there were 10 cases reported, of which 8 were from vessels.

In Canada the principal cities reporting cases of smallpox were Halifax, 136 cases; Toronto, 26 cases, with 2 deaths; Kingston, 47 cases; and Victoria, 28 cases.

The greatest prevalence in Mexico was at Mexico City, where 655 deaths, and at Monterey, where 89 deaths, were reported.

In Guatemala from December to May it was epidemic at Guatemala City, where 606 cases with 200 deaths were reported.

The disease was present in Salvador, at Santa Ana, and Santiago.

In South America a large number of cases was reported from Brazil. Rio de Janeiro, with a population of 811,443, reported 13,364 cases with 6,010 deaths. Pernambuco, with a population of 210,000, reported 507 deaths, and Bahia, with a population of 265,000, reported 1,330 cases with 91 deaths. (The difference in the mortality rate of this disease in Rio de Janeiro, with its 13,364 cases and 6,010 deaths, and that in the United States, with its 24,657 cases and 75 deaths, is very marked, the disease showing in one place great virulence and in the other a form exceedingly mild.)

In Argentina there were 546 cases reported in Buenos Aires Province and 9 deaths in the city of Buenos Aires. In Ecuador there were 51 deaths at Guayaquil. In Peru the cities reporting the greatest number of cases were Lima and Callao.

In Europe, the larger cities reporting cases were Bristol, Christiania, Paris, Naples, St. Petersburg, Moscow, Odessa, Belgrade, and Constantinople.

In Asia, the cities reporting the greatest number of cases were, in India, Bombay, Calcutta, and Rangoon; in China, Hongkong, Tientsin, and Shanghai; in Japan, Tokyo and Osaka; in Siberia, Vladivostok; in Manchuria, Dalny; in Indo-China, Cholen and Saigon; in Ceylon, Colombo; in Java, Batavia; in Turkey in Asia, Bagdad and Smyrna; in Arabia, Aden; in Persia, Hamadan, Kermanshah, and Teheran; and in Africa, Algiers, Bona, Cairo, Alexandria, Suez, and Tripoli.

PLAGUE IN THE UNITED STATES—STATISTICAL.

During the fiscal year 1909 California was the only State in which plague was reported. There was a fatal case in Oakland, 1 in Concord, and 1 in the Prenois Valley, Contra Costa County, during July, and 1 case in Los Angeles in August, 1908. In San Francisco no case of human plague was reported, but the disease was found in rats, the last case of rodent plague being recorded October 23, 1908. Plague was also found in rodents in Seattle, Oakland, and in Contra Costa County. In Seattle the last infected rat was found September 26, 1908, and in Oakland December 1, 1908.

During the year 42 plague-infected ground squirrels were found in Contra Costa County, the last being found June 30, 1909. The squirrels came from widely distributed points, and revealed the important fact that these rodents, living on the ranches and in the hills and valleys, were harboring the bacillus of plague, and that measures were needed to prevent the reintroduction of the disease into the cities. Between July 1 and September 10, 1909, 178 more infected squirrels were found in Contra Costa County and 19 in Alameda County.

PLAGUE IN OTHER COUNTRIES.

India.—As usual, plague has been epidemic to a much greater extent in India than in any other country. A marked change for the better is, however, apparent. In the fiscal year 1907 there were 1,022,275 cases of this disease reported in India; in 1908 the number had dropped to 730,729, and in 1909 there were only 168,403 cases. The deaths show a corresponding decrease from 860,556 in 1907 to 133,626 in 1909. It may be concluded either that plague in India is losing its virulence or that the sanitary measures being carried on are becoming effective.

South America.—Plague continues to prevail in Venezuela, Ecuador, Peru, Chile, Uruguay, and Brazil. In Venezuela a larger number of cases and deaths were reported than last year; in Ecuador some improvement has been noted; in Peru the condition remains about the same, 1,192 cases with 560 deaths having been reported; in Uruguay 2 cases were reported in May; in Brazil cases still occur, but to no very great extent; in Argentina, where the disease was present in 1908, no cases were reported in 1909. In the South American countries the disease has prevailed mainly at the seaports, the infection having undoubtedly been introduced by vessels coming from infected localities.

West Indies.—Trinidad reported 3 deaths from plague in 1908, and 18 cases with 14 deaths in 1909. This is the nearest encroachment of the disease on the United States from the south up to the present time. It, however, is a constant reminder of the danger from this direction and the need of watchfulness.

Europe.—Cases of plague occurred on vessels arriving at Trieste, at Liverpool, and at the quarantine station at Doel, in Belgium. A case also occurred at the laboratory at Elstree, near London. There was also a case at Libau, in Russia, but the disease did not spread.

Asia.—Plague was present in various places in Turkey and in the Bahrein Islands in the Persian Gulf. In China the greatest prevalence was at Hongkong. In Japan outbreaks occurred on the islands of Formosa and Awaji. Kobe, Osaka, and Yokohama also had cases.

Africa.—Cases of plague occurred in Egypt, the British Gold Coast, British East Africa, and German East Africa. The disease was also present in Zanzibar and at Mauritius.

Azores.—Outbreaks of plague occurred at Fayal and Terceira.

Australia.—Cases of plague were reported at Adelaide, Brisbane, Sydney, and Newcastle.

YELLOW FEVER—STATISTICAL.

There was no yellow fever in the United States.

In Cuba during the fiscal year there were in Habana 5 cases with 3 deaths, 3 cases being from vessels from Mexican ports and 1 case from a vessel from Buenos Aires by way of West Indian ports. In Oriente Province there were 24 cases with 6 deaths; the greatest outbreak being at Daiquiri, from June to August, when there were 20 cases with 4 deaths; at Firmeza there was 1 case in August; a case removed from Antilla to Santiago in August was fatal. In December 2 other cases, 1 fatal, were removed from San Luis to Santiago.

In Porto Rico at San Juan there was 1 case in July from a vessel from West Indian ports.

In the West Indies in the Barbados from the outbreak in December to June 24, there were 86 cases with 36 deaths; of this number 11 cases were reported at Bridgetown, where there had been a fatal case in October. The other cases occurred in the parishes. The greatest prevalence was in the parish of St. Joseph. In March a case occurred in Speightstown. In Curaçao there were 2 cases with 1 death; in Martinique at Fort de France, 78 cases with 19 deaths; in St. Vincent Island, 3 cases with 2 deaths; in Trinidad, Port of Spain, a fatal case in January and 1 also fatal in April.

In Mexico there were at Merida 61 cases with 28 deaths, and at Veracruz 47 cases with 24 deaths; at Maxcanù, 7 cases with 4 deaths. During the first half of the fiscal year there was at Acapulco 1 fatal case from a vessel; at Campeche there were 2 fatal cases; Frontera, 1 case; Laguna del Carmen, 2 cases; Laguna de Terminos, 8 cases with 2 deaths, 4 cases being from a vessel from Venezuela; Tierra Blanca, 1 case; Zumpich, 1 case. In the second half of the fiscal year there were in vicinity of Merida, at San Bernardo plantation, 8 cases with 4 deaths; at Sodzil plantation, 7 cases with 5 deaths, and at Ticul 1 case.

In Honduras at Ceiba there was 1 case in September.

In South America, at Rio de Janeiro, there were 3 fatal cases from June to August, and 1 case in April; in Bahia there were 217 cases with 90 deaths, 3 cases being from a vessel; at Para, 136 deaths; Manaos, 60 deaths; Pernambuco, 11 deaths. In Colombia, at Cartagena, there was 1 fatal case in January. In Ecuador, at Guayaquil, there were 180 deaths. In Dutch Guiana there were at Paramaribo 32 cases with 8 deaths in the first half of the fiscal year.

In Europe the only occurrence of yellow fever was in France, at St. Nazaire, in September and October, where there were 11 cases with 6 deaths from a vessel from West Indian ports; and June, 1909, in Portugal at Lisbon, where 2 cases were quarantined from a vessel from Para.

CHOLERA—STATISTICAL.

In the Philippine Islands, at Manila, there were 981 cases of cholera, with 647 deaths, and in the provinces 23,094 cases and 14,364 deaths. The greatest prevalence in the provinces was in Iloilo, with 5,715 cases and 3,381 deaths, and in Capiz, Ilocos Sur, Negros Occidental, and Pangasinan, each having over 2,000 cases. Three cases were reported on vessels, 2 cases with 1 death in September from Manila; 1 case in April from Iloilo.

In Austria at Ostrowo there were 77 cases and 39 deaths, and at Tarnopol 1 fatal case.

In all Russia there were 31,436 cases, with 14,837 deaths. In St. Petersburg there were 10,359 cases, with 4,019 deaths, from September to May. In other localities the greatest number of cases was in Ekaterinislav, 1,114 cases with 540 deaths; Kooban, 1,834 cases with 975 deaths; Rostov, 1,174 cases with 531 deaths; Saratov, 1,682 cases with 936 deaths, and Nijni Novgorod, 755 cases with 330 deaths. In the Astrakhan government district there were 1,722 cases with 13,045 deaths; Samara government district, 1,183 cases with 542 deaths; and in the Don territory, 3,035 cases with 1,451 deaths. In Russia, in Asia, there were at Baku 227 cases with 120 deaths; at Tiflis 168 cases with 81 deaths; at Tomsk 414 cases with 236 deaths. The disease was present in the Transcaspian district in September.

In Persia, at Teheran, there was a fatal case in July, and the disease was epidemic at Tabriz from October to December, when 1,003 cases with 500 deaths were reported.

In India the cities reported the greatest number of deaths in the order mentioned: Calcutta, 1,626; Madras, 1,160; Bombay, 435; Rangoon, 163, and Negapatam, 111. In Calcutta there were 2 deaths among the shipping.

In China 55 deaths were reported from Hongkong. From July to August cholera was epidemic in Hankau, there being 10,790 cases with 1,397 deaths. During the same period there were 200 deaths at Hanyang and 100 cases in the military camp at Wuchang. The disease was present at Shanghai, Kulangsu, Ichang, and Swatow.

In Japan cholera was present in the first half only of the fiscal year, when 448 cases with 129 deaths were reported. The greatest prevalence was at Moji, 159 cases with 79 deaths; in Yura, Awaji Island, 90 cases with 6 deaths; Tsushima Island, 70 cases; at Tokyo, 16 cases with 5 deaths. There were cases at Nagasaki, Yokohama, Ikishima, Kokoora, Kuchinotsu, Kure, Obama, Sasebo, Tokushima, Wakamatsu,

and in Chiba, Ehime, Fukuoka, Kanagawa, and Yamaguchi kens. Cholera was reported on vessels at Kuchinotsu, Nagasaki, and Yokohama.

In Korea in the first half of the fiscal year there were 33 cases with 2 deaths, and at Fusan 2 cases. Cholera was present on Nakanoshima Island in October.

In Indo-China there were 334 cases with 239 deaths reported from Cholen, Saigon, and Bien Hoa. In Ceylon, at Colombo, 51 cases with 35 deaths. In Siam, at Bangkok, 2 cases with 1 death. At Bassein cholera was present in May. In the Straits Settlements, at Singapore, there were 196 deaths. There was a case at Petalung in September, and 1 case was reported from a vessel at Penang in February.

SERVICE PUBLICATIONS.

The service publications may be described under five heads: (1) Annual reports; (2) Weekly Public Health Reports; (3) bulletins of the Hygienic Laboratory; (4) bulletins of the Yellow Fever Institute; (5) public health pamphlets or brochures.

Annual reports.—The laws authorizing the publication of these reports are as follows. Act approved July 1, 1902, section 9:

It shall be the duty of the Surgeon-General to transmit annually to the Secretary of the Treasury, for transmission to Congress, a full and complete report of the transactions of said service, including a detailed statement of receipts and disbursements.

Joint resolution approved February 24, 1905, section 2, provides:

That there shall be printed each year 4,000 copies of the annual report of the Surgeon-General of the Public Health and Marine-Hospital Service, bound in cloth, to be distributed by the Surgeon-General.

Weekly Public Health Reports.—These reports are published under authority of section 4 of the act of Congress approved February 15, 1893, quoted in part as follows:

The Secretary of the Treasury * * * shall prepare, publish, and transmit * * * weekly abstracts of the consular sanitary reports and other pertinent information received by him. * * *.

The Weekly Public Health Reports, containing the above information, are published in an edition at present of 3,700 copies. These reports are arranged in two parts, the first relating to the United States, and the second to our insular possessions and foreign countries. In the first part are published articles or contributions of special present importance, which are frequently reprinted as separates, the latter being distributed in larger numbers than the full publication; reports of sanitary operations; statistical reports of morbidity and mortality in the States and cities of the United States; special tables giving weekly reports of the greater epidemic diseases, such as smallpox and plague, and special tables giving the weekly record of cases and deaths of the principal contagious or infectious diseases in the cities of the United States having a population of more than 10,000, there being included in this table the populations of said cities according to the last census.

In the second part are published articles or contributions and statistical tables similar to the above relating to the cities and territories in foreign countries and in our insular possessions.

Bulletins of the Hygienic Laboratory.—Section 1 of the joint resolution of Congress approved February 24, 1905, provides:

That there shall be printed each year the bulletins of the Hygienic Laboratory, not exceeding ten in number in any one year, * * * in such editions, not exceeding 5,000 copies in any one year, as the interests of the Government and the public may require, subject to the discretion of the Secretary of the Treasury.

These bulletins have been described in the portion of this report relating to the Hygienic Laboratory. The total number of bulletins issued by the Laboratory to the present time is 57.

The demands for Bulletin No. 41, "Milk and Its Relation to the Public Health," quickly exhausted the first edition, and a new revised edition has been published as Bulletin No. 56.

Bulletins of the Yellow Fever Institute.—Section 1 of the joint resolution of Congress approved February 24, 1905, provides:

That there shall be printed each year the bulletins * * * of the Yellow Fever Institute of the Public Health and Marine-Hospital Service of the United States, not exceeding five in number in any one year, in such editions, not exceeding 5,000 copies in any one year, as the interests of the Government and the public may require and in the discretion of the Secretary of the Treasury.

One bulletin, entitled "The Prophylaxis of Yellow Fever," was issued in February of this year, being Bulletin No. 17 of the Yellow Fever Institute.

Public health pamphlets or brochures.—These pamphlets or brochures are published under authority of section 4 of the act of Congress approved February 15, 1893, as quoted in the foregoing, and also in the acts making appropriations for the sundry civil expenses of the Government for public printing and binding "for the Treasury Department." Following is a list of the brochures published during the fiscal year and the editions of each:

	Edition.
Trachoma, its Character and Effects-----	5,000
Pellagra, A Precis-----	3,000
Prevalence of Pellagra in the United States-----	3,500
Precis Upon the Diagnosis and Management of Outbreaks of Smallpox, Diphtheria, and Scarlet Fever-----	3,000
Precis Upon the Diagnosis and Prevention of Smallpox-----	3,000
Plan of Organization for Suppression of Smallpox in Communities not Provided with an Organized Board of Health-----	3,000
Prophylactic Value of Vaccination-----	3,000
Colored Antituberculosis League—Plan of Organization-----	3,000
The Present Status of Leprosy-----	3,500
Studies on Leprosy (two pamphlets)-----	{ 2,500 4,000
Notes on Rat Leprosy-----	1,000
The Present Pandemic of Plague-----	3,500
Plague Investigations in India-----	1,000
California Ground Squirrels-----	5,000
Campaign Against Ground Squirrels in Contra Costa County, California-----	1,000
Experimental Investigations of Biting of Man by Fleas from Rats and Squirrels-----	2,000
Dengue Fever as Observed in Brownsville, Texas, in 1907-----	1,000
Prevention and Destruction of Mosquitoes-----	2,500
Danger and Prevention of Tetanus from Fourth of July Wounds-----	1,000
Transactions of the Sixth Annual Conference of State Boards of Health with the Public Health and Marine-Hospital Service-----	750
Regulations for the Sale of Viruses, Serums, Toxins, and Analogous Products-----	1,000
Official Catalogue of Publications of the Service-----	6,000

Since the close of the fiscal year new editions of a number of the above have been issued.

NEED OF LARGER EDITIONS AND APPROPRIATION.

The importance of the foregoing publications is indicated by their titles, and I would respectfully invite attention to the limited editions of each and their inadequacy when the great purpose for which they

are published is considered, viz, the spread of information concerning sanitary and health matters.

In the present and future development of this service it seems evident that a far wider distribution of information of the above character is necessary in order that the service may properly perform its function as the public health service of the United States, and I have respectfully to urge a larger appropriation for the annual printing of the service publications. This is an obligation of the General Government, the propriety of which can not be questioned.

According to the present arrangement, the expense of printing the public health publications is met from the general appropriation for printing and binding for the Treasury Department, which during the last fiscal year was \$365,000. I am informed that of this amount the expenditures for the service publications was \$25,537.88.

While acknowledging the necessity of economy in printing, it seems obvious that this economy should be exercised toward useless and wasteful printing, and it also seems obvious that the amount spent last year for service publications, \$25,537.88, can not provide for all the printing that should with good reason be done for the spreading of information relating to the public health.

I have, therefore, to recommend that the amount necessary for the above-named purpose be separately estimated for and asked of Congress, either as a special item or as a specified allotment from the general appropriation for printing of the Treasury Department.

Some of the printing required by the bureau for its bulletins during the last fiscal year was necessarily postponed to the ensuing year because of the exhaustion of the general appropriation. I believe a fair estimate of the amount required for the printing of the next fiscal year on account of service publications would be \$50,000.

MARINE HOSPITALS AND RELIEF.

RELIEF TO SEAMEN.

During the fiscal year 53,074 seamen were treated at the various stations of the service. Of these 14,204 were treated in hospital and 38,870 were treated as outpatients. The number of days' hospital relief furnished seamen was 449,262.

Eight hundred and seventy-nine seamen from foreign vessels were treated. The number of days' hospital relief furnished these seamen was 12,305.

RELIEF STATIONS.

The service operated 21 hospitals, all of which are owned by the Government, and maintained 126 other stations, including 2 discontinued during the year, where hospital and dispensary relief were furnished.

On account of the small amount of relief work done the station at St. Michael, Alaska, was closed, and that at Sitka, Alaska, was also discontinued when the department abolished the customs office at that port.

The marine hospital under construction at Buffalo, N. Y., is approaching completion, and it is expected to occupy it during the early part of the next fiscal year.

Considerable progress has also been made in the construction of the marine hospital at Pittsburg, Pa., appropriated for by acts of Congress approved March 31, 1902, and March 3, 1903.

Plans have been drawn for the reconstruction of the marine hospital at New York, in accordance with appropriation made by Congress for that purpose.

RELIEF TO SUFFERERS FROM THE GREAT FIRE IN CHELSEA, MASS.

During the year relief was continued at the Marine Hospital at Chelsea to certain accident, emergency, and maternity cases, under authority of act of Congress approved May 23, 1908, accommodations for which in the city of Chelsea were destroyed by fire in April, 1908. The following statement shows the number of cases treated on this account:

Influenza -----	1	Rheumatism -----	2
Enteric fever -----	8	Rheumatic fever -----	1
Erysipelas -----	1	Carcinoma œsophagus -----	1
Syphilis, secondary -----	1	Debility -----	2
Gumma gluteal muscles -----	1	Anæmia -----	1
Meningitis -----	1	Epilepsy -----	1
Opium poisoning -----	1	Vertigo -----	1
Effects poison -----	1	Hemorrhage brain -----	1
Foreign body in hand -----	1	Spinal hemorrhage -----	1

Bronchitis	1	Contusion—Continued.	
Pneumonia	8	Knee	1
Pneumothorax	1	Ankle	2
Pleurisy	1	Foot	1
Tubercle costal cartilage	1	Multiple injuries	2
Tubercle lung	2	Concussion brain	2
Colic	1	Fracture:	
Appendicitis	3	Skull	5
Intestinal obstruction	1	Nose	1
Indigestion	2	Jaw	1
Hernia	1	Clavicle	3
Sacro-iliac disease	1	Malleolus	1
Bright's disease	1	Ribs	2
Nephritis, acute	2	Humerus	2
Cystitis	2	Femur	6
Gallstones	1	Tibia and fibula	11
Retention urine	1	Ankle	1
Exhaustion	3	Toe	1
Burns	2	Gunshot wounds	1
Inflammation connective tissue	1	Wound:	
Synovitis knee	1	Scalp	9
Caries, ribs	1	Face	5
Necrosis tibia	2	Radial artery	1
Necrosis phalanx foot	1	Hand	5
Rupture internal lateral ligament	1	Leg	1
Contusions	1	Foot	2
General contusions	6	Ankle	1
Contusion:		Amputation arm	2
Shoulder	1		
Back	1		
Hips	1	Total	148

The number of days during which these patients were treated was 2,696.

DIPHTHERIA AT TATOOSH ISLAND, WASH.

On August 15, 1908, a telegram was received from the Chief of the Weather Bureau, reporting that the Weather Bureau observer on Tatoosh Island, Wash., his wife, child, and assistant, were sick with diphtheria, and that one of the children had already died, and asking for assistance from this service, as no medical attention could be procured on the island.

A telegram was sent at once to the medical officer in command of the marine hospital at Port Townsend, directing him to proceed immediately to that place with a supply of antitoxin and render what assistance he could; all expenses to be paid by the Weather Bureau.

Doctor Stimpson immediately sent a physician, nurses, and supplies to Tatoosh Island, and then under orders proceeded there himself, and assumed charge of the care of the sick until all had recovered.

RELIEF TO NATIVES OF ALASKA.

One hundred and fifty-three natives were treated by officers detailed aboard revenue cutters sailing in Alaskan waters. The number of times outpatient relief was furnished these natives was 245.

AID TO OTHER BRANCHES OF THE GOVERNMENT.

Revenue-Cutter Service.—One thousand four hundred and thirty-seven men were physically examined, of whom 197 were rejected.

Mention of special assistance to this service in the nature of duty on special boards on United States revenue cutters, etc., will be found under other heads.

Steamboat-Inspection Service.—One thousand and seventy-one pilots were examined as to visual capacity, of whom 44 were rejected.

Life-Saving Service.—One thousand nine hundred and seventeen keepers and surfmen were physically examined, and 62 rejected.

Three hundred and ninety-nine papers referred to the Surgeon-General by the General Superintendent of the Life-Saving Service were acted upon by direction of the Surgeon-General. These papers called for an expression of opinion upon the medical evidence of disability submitted for claims for benefits under the act of May 4, 1882, and upon the physical fitness of candidates for enlistment and reenlistment.

Coast and Geodetic Survey.—One hundred and fourteen employees and applicants for appointment were examined, and 31 were rejected.

Light-House Service.—Ninety-one applicants for enlistment were examined, and 1 was rejected.

Immigration Service.—One hundred and forty-three persons connected with this service were physically examined, and 1 was rejected.

Civil Service Commission.—One hundred and thirty-two applicants for appointment were physically examined, and 15 rejected.

Isthmian Canal Commission.—Seven employees and applicants for appointment were physically examined, and none rejected.

In addition to the above, upon the request of the heads of the respective departments, physical examinations were made at different places in the country, of three clerks under the Post-Office Department, with a view to determining whether they were afflicted with tuberculosis, and of three employees of the Department of Commerce and Labor, with a view to determining their physical and mental condition.

PHYSICAL EXAMINATION OF MERCHANT SEAMEN.

Physical examinations were made of 364 American merchant seamen, of whom 31 were rejected, and 36 foreign seamen, of whom 7 were rejected.

PHYSICAL EXAMINATIONS, PHILIPPINE ISLANDS.

In the Philippines 121 examinations were made of seamen and persons connected with the civil service, and in the United States physical examinations were made of 68 applicants to serve in the islands. Of the latter 6 were rejected.

PURVEYING DEPOT.

The following statistics show the transactions of the purveying depot during the fiscal year:

SUPPLIES PURCHASED.

Dry goods-----	\$15, 689. 99
Drugs and chemicals-----	12, 643. 11
Surgical instruments and appliances-----	7, 837. 88
Pharmaceutical implements, etc-----	4, 758. 02

Beds and bedding	\$4,160.13
Alcohol, wines, etc.	2,985.10
Rubber goods	1,683.84
Books and journals	1,389.35
Flags	665.75
Packing boxes and sawdust	424.65
Bacteriological supplies	309.25
Total	52,547.07

Cr.

By bills paid direct from funds:

Quarantine service	\$1,511.63
Maintenance	1,386.97
Bureau (books and journals)	373.65
Care of seamen, etc. (journals)	255.70
Epidemic fund	149.45
Hygienic laboratory	80.28
	3,757.68
Total	48,789.39

By amounts reimbursed from other appropriations for supplies issued from stock:

Quarantine service	\$2,693.63
Leprosy investigation station	635.05
Revenue-Cutter Service	247.08
Treasury Department	213.32
Epidemic fund	65.81
	3,854.98

Net expenditures chargeable to appropriations for purveying depot (in amount \$45,000)

Salaries	\$6,040.00
Rent	3,250.00
Operating expenses	366.48
	9,656.48

Total net expenditures 54,590.98

Number of requisitions filled	359
Number of packages shipped	2,535
Total weight of supplies shipped	pounds 259,992

AMENDMENTS TO REGULATIONS.

Officers of Revenue-Cutter Service, on leave or retired, entitled to certain relief.—Under date of March 23, 1909, an amendment to the regulations was made authorizing relief by the service to officers of the Revenue-Cutter Service on leave, on sick leave or retired, at marine hospitals owned by the Government and dispensaries conducted by the service, provided no bills for such relief are incurred.

Civilian officers and seamen of naval auxiliaries admitted to treatment.—Upon request of the Surgeon-General of the Navy, approved by the Secretary of the Navy, the regulations were amended so that civilian officers and seamen employed on board naval auxiliaries could be treated, upon the written request of their commanding officers, as patients of the Public Health and Marine-Hospital Service at first, second, and third-class stations, at rates to be fixed by the department each year.

INCREASED AIR SPACE IN FORECASTLES OF AMERICAN VESSELS.

On May 18 a communication was addressed to the Commissioner of Navigation requesting an expression of opinion regarding the necessity for increasing the size of forecastles and providing more air space for each seaman than is now allowed under the navigation laws of the United States, and on June 12 the commissioner replied stating that he expected to consider the matter in his annual report for 1909.

PROPOSED AMENDMENT TO LAW RELATING TO SHIP'S MEDICINE CHEST.

The law requiring American vessels to carry a medicine chest should be amended to provide that the chest shall include such articles as may be prescribed by the Surgeon-General of the Public Health and Marine-Hospital Service, and that the same shall be inspected once each year by an officer of the service.

The law now requires that vessels shall carry a medicine chest, but does not specify what should be in it. At the same time a "Handbook of the ship's medicine chest" has been published by the service and distributed to masters of vessels, which contains instructions for first aid to the injured and other pertinent information for the masters of merchant vessels, and there should be a provision of law requiring that a ship's medicine chest should contain articles corresponding with the demands made by this book.

TUBERCULOSIS SANATORIUM AT FORT STANTON, N. MEX.

Passed Asst. Surg. H. S. Mathewson, in charge, reports as follows regarding the transactions of the sanatorium for the fiscal year ended June 30, 1909:

During the year under review the maximum number of patients rose to 265 and it was necessary to suspend transfers for a short time. The sanatorium as planned accommodates comfortably 250 patients and it does not seem wise to attempt to far exceed that number with the existing dining room and kitchen equipment.

The tent village was added to during the winter and now numbers 81 tents and 16 tent houses, furnishing outdoor sleeping accommodations for 194 tuberculous patients or attendants. Several months ago one tent was removed from its frame and a permanent rubberoid roof was erected in its place, canvas curtains being placed on the sides and ends of the structure. This tent house has given excellent service and is considered far superior to a canvas-covered house. Tents require constant repairs and after every rain or wind storm complaints are frequent of leakage during the night, damage to flies, etc. The life of a canvas tent does not exceed two years and the expense for renewals is a constant item. The station records show that since the sanatorium was established 356 tents and 426 tent flies have been furnished, and it is believed that supplying the tents with a permanent roof will effect a considerable economy.

During the year the dairy herd were tested with tuberculin supplied by the Department of Agriculture and found free from tuberculosis. This herd is increasing in number and an enlargement of the dairy corral is needed for its proper accommodation.

Owing to the isolation of this station the question of providing mental diversion and amusement for the patients is of great importance. Recommendation has been made that building No. 30 be converted into an amusement hall and equipped with box-ball alley, shuffleboard, and pool tables. The general assembly hall, on the second floor of building No. 9, is utilized at present for the giving of entertainments and a fund is being raised on the station to add to its equipment a moving-picture apparatus, but this hall does not supply the need indicated above.

As to the professional work of the sanatorium, the statistical matter herewith submitted speaks for itself. It is believed that the results obtained compare favorably with results obtained in other institutions treating all classes of consumptives. From time to time encouragement is given by reports of continued good health and ability to work enjoyed by former patients several years after their discharge from the sanatorium.

In the scientific study of tuberculosis certain investigations are in progress in the laboratory of the station which, it is hoped, will prove of value in the settlement of questions still in dispute.

STATISTICS (FORT STANTON SANATORIUM).

Patients under treatment July 1, 1908.....	194
Patients admitted during the year.....	205
	<hr/>
	399
	<hr/>
Patients under treatment July 1, 1909.....	211
Patients discharged during the year.....	188
	<hr/>
	399
	<hr/>
Ages of patients treated during the year:	
Under 25 years.....	71
Between 25 and 34 years.....	136
Between 35 and 44 years.....	103
Between 45 and 54 years.....	54
Over 54 years.....	23
Nontubercular (lungs).....	12
	<hr/>
	399
	<hr/>
Heredity in patients treated during the year:	
History of tuberculosis in parents.....	90
No history of tuberculosis in parents.....	259
History of tuberculosis in parents doubtful.....	38
Nontubercular (lungs).....	12
	<hr/>
	399
	<hr/>
Stage of disease of patients admitted:	
Incipient.....	27
Moderately advanced.....	70
Far advanced.....	100
Nontubercular (lungs).....	7
No examination.....	1
	<hr/>
	205
	<hr/>

General condition on arrival:

Good	46
Fairly good	20
Fair	70
Poor	60
Extremely poor	1
No examination	1
Nontubercular (lungs)	7
	205

Tubercle bacilli in sputum:

Were found in	167
Were not found in	29
No examination	2
Nontubercular (lungs)	7
	205

Record of pulmonary hemorrhages of patients admitted:

Before arrival only	50
After arrival only	4
Both before and after arrival	14
Neither before nor after	88
Streaked sputum	41
No examination	1
Nontubercular (lungs)	7
	205

Greatest number of patients under treatment at one time during the year-- 265

Condition of 188 patients at time of discharge:

Cured	1
Apparently cured	25
Arrested	37
Improved	41
Unimproved	9
Died	67

Discharged cases nontubercular (lungs):

Cured	1
Apparently cured	1
Improved	4
Unimproved	1
Died	1

118

DURATION OF STAY AND CHARACTER OF CASES.

Character of case.	Longest stay.			Shortest stay.			Average stay.		
	Yrs.	mos.	dys.	Yrs.	mos.	dys.	Yrs.	mos.	dys.
Cured	6	6	16	6	6	16	6	6	16
Apparently cured	3	5	2	0	3	22	0	11	11
Arrested	7	9	5	0	1	19	1	2	0
Improved	6	2	8	0	1	19	1	2	2
Unimproved	1	5	29	0	1	15	0	6	22
Death	7	7	16	0	0	3	1	3	5

Does not include 8 nontubercular (lungs) cases.

LIST A.—PATIENTS DISCHARGED WHO WERE UNDER TREATMENT AT BEGINNING OF FISCAL YEAR.

	Cured.	Appar- ently cured.	Arrested.	Im- proved.	Unim- proved.	Died.	Total.
Incipient.....	0	5	2	0	0	0	7
Moderately advanced.....	0	7	11	8	1	9	36
Far advanced.....	1	2	11	9	2	33	58
Cases discharged.....	1	14	24	17	3	42	101

LIST B.—PATIENTS DISCHARGED WHO WERE ADMITTED DURING THE YEAR.

	Cured.	Appar- ently cured.	Arrested.	Im- proved.	Unim- proved.	Died.	Total.
Incipient.....	0	9	2	0	0	0	11
Moderately advanced.....	0	2	4	13	3	3	25
Far advanced.....	0	0	7	11	3	22	43
Cases discharged.....	0	11	13	24	6	25	79

Does not include 8 nontubercular (lungs) cases.

Patients under treatment July 1, 1908.....	194
Patients discharged during the year from these.....	101
Patients remaining under treatment from these.....	93
Patients admitted during the year.....	205
Patients discharged during the year from these.....	79
Patients remaining under treatment from these.....	126
Nontubercular (lungs) cases discharged.....	8
Length of time under treatment at sanatorium of the 188 discharged cases:	
Over two years.....	30
Between one and two years.....	40
Between six and twelve months.....	40
Between three and six months.....	44
Under three months.....	26
Nontubercular (lungs)	8
	188

Of the patients discharged during the year, 8 were under treatment for less than thirty days, one of which was nontubercular (lungs): Result in all 8 cases death.

Cause of death of 67 patients dying during the year:

Tuberculosis.....	59
Other causes	8
	67

During the year there were under treatment, in addition to the above, tuberculous officers and employees, as follows:

Under treatment July 1, 1908.....	14
Admitted during the year.....	9
	23
Remaining under treatment June 30, 1909.....	12
Discharged during the year.....	11
	23

Condition of tuberculous employees at time of discharge:

Cured	0
Apparently cured	5
Arrested	3
Improved	2
Unimproved	0
Died (appendicitis—tuberculosis arrested)	1
	<hr/>
	11
	<hr/>
Number of physical examinations made during the year	1, 253

LABORATORY—FORT STANTON.

The routine work in the laboratory during the fiscal year comprises the following:

Examinations of sputum	2, 460
Examinations of urine	1, 607
Blood examinations for tubercle bacilli	27
Blood examinations in which tubercle bacilli were found	3
Blood examinations for malarial parasite	2
Feces examined for tubercle bacilli	17
Cows tested with tuberculin	76
Cows found infected	0
Stools and urine examined for typhoid bacilli	25
Pathological specimens prepared for microscopical examination	155
Mice inoculated with sputum to determine presence of pneumococcus	118

PRODUCTS OF THE STATION.

During the year the dairy produced 37,468 gallons of milk, and a small amount of butter, i. e., 292 pounds.

During the first seven months of the year the station was supplied with beef from the station range, 134 head being slaughtered, furnishing 59,465 pounds of beef. The number of cattle in the beef herd is 1,654.

The station still breeds all horses necessary for station use, the herd at present numbering 71 head. These horses, however, are small, and the station should be supplied with a few large mares for breeding purposes.

During the year 160 hogs were slaughtered, supplying the station with 12,559 pounds of pork and 75 pounds of lard.

The poultry yard supplied 603 dozen eggs and 978 pounds of dressed chicken.

The total yield of alfalfa for the season of 1908 was 215 tons. Corn fodder and oat hay were raised to the amount of 72 tons.

The garden was operated successfully during the year, the station being supplied with fresh vegetables from it.

CERTAIN CASES NOT SENT TO FORT STANTON.

The experience of the medical officer in command shows that certain classes of patients are not benefited at Fort Stanton. It will be recalled that Fort Stanton has an elevation of more than 6,000 feet. The transfer of such patients therefore from the marine hospitals to Fort Stanton has been discontinued, and special arrange-

ments will be made for their treatment in tents on the reservations connected with the several hospitals. The classes of patients above alluded to are as follows:

- (1) Patients whose pulse remains above 100 and temperature remains above normal after a few weeks treatment in hospital.
- (2) Cases of tuberculosis complicated by asthma.
- (3) Cases of tuberculosis complicated by uncompensated valvular disease of the heart.
- (4) Tuberculosis complicated by chronic alcoholism.
- (5) Chronic fibroid cases.

PERSONNEL.

COMMISSIONED AND OTHER OFFICERS.

The commissioned medical officers at the beginning of the fiscal year, July 1, 1908, numbered 128, as follows: The Surgeon-General, 5 assistant surgeon-generals, 29 surgeons, 62 passed assistant surgeons, and 31 assistant surgeons.

At the close of the fiscal year, June 30, 1909, though numbers in several grades were changed, the total number was the same as at the beginning of the year, viz, 128, consisting of the Surgeon-General, 5 assistant surgeon-generals, 35 surgeons, 66 passed assistant surgeons, and 21 assistant surgeons.

The changes during the year were as follows: Five passed assistant surgeons promoted to the grade of surgeon, 13 assistant surgeons promoted to the grade of passed assistant surgeon, 4 candidates passed the examination and were commissioned as assistant surgeons. Death removed from the corps 1 surgeon, 1 passed assistant surgeon, and 1 assistant surgeon. One passed assistant surgeon resigned. On account of physical disability, 1 surgeon and 1 passed assistant surgeon continued on "waiting orders."

Casualties.—Surg. Alexander C. Smith died at Pittsburg, Pa., January 15, 1909, from injuries received in an accident. Passed Asst. Surg. William M. Wightman died May 16, 1909, at Guayaquil, Ecuador, of yellow fever contracted in line of duty. Asst. Surg. William W. Miller died November 24, 1908, at Washington, D. C., of typhoid fever contracted during his investigations into the cause of the prevalence of this disease in Washington.

Assignments.—Among other assignments of commissioned medical officers during the fiscal year were the following: Fourteen were assigned to exclusive immigration duty, their services being supplemented by employment of acting assistant surgeons; 6 to the quarantine service of the Philippine Islands; 7 to vessels of the Revenue-Cutter Service; 23 to the quarantine stations in the continental United States, Porto Rico, and the Hawaiian Islands; 6 to duty in foreign countries to prevent the introduction into the United States of epidemic disease.

Special details.—Three commissioned medical officers continued on detail duty with the Isthmian Canal Commission, serving, respectively, as follows: Surg. H. R. Carter as director of hospitals, Canal Zone; Surg. J. C. Perry, as chief quarantine officer and in charge of the quarantine at Panama; and Passed Asst. Surg. Claude C. Pierce as quarantine officer at Colon.

Passed Asst. Surg. V. G. Heiser, in addition to his duties as chief quarantine officer, has been continued as director of health of the Philippine Islands, and Passed Asst. Surg. A. J. McLaughlin as assistant director of health.

Passed Asst. Surg. B. J. Lloyd, under the act of Congress approved February 15, 1893, has been continued for duty at Guayaquil, Ecuador.

Personnel Hygienic Laboratory.—At the close of the fiscal year, there were on duty in the Hygienic Laboratory, in addition to the director, assistant director, and 3 chiefs of divisions, 7 passed assistant surgeons, 2 assistant pharmacologists, 2 pharmacists, 1 artist, 8 technical assistants, and 28 attendants.

Sanitary inspectors.—At the beginning of the fiscal year 3 sanitary inspectors were on duty. One resigned and the designation of another was changed to that of quarantine inspector.

Acting assistant surgeons.—At the beginning of the fiscal year there were 281 acting assistant surgeons on duty; 272 were appointed, 6 died, 268 were separated from the service by limitation of appointment, resignations, and removals, leaving on duty at the close of the fiscal year 279 such officers.

Medical inspectors.—Two female inspectors served during the entire year for the inspection of women passengers—1 at Honolulu, Hawaii, and 1 at San Francisco quarantine station.

Internes.—At the beginning of the fiscal year there were 12 internes on duty at the various marine-hospital stations; 15 were appointed and 17 separated from the service by reason of resignation, leaving 10 on duty at the close of the fiscal year.

Pharmacists.—At the beginning of the fiscal year there were on duty 48 pharmacists, divided as follows: Pharmacists of the first class, 16; second class, 20; third class, 12. One pharmacist of the first class, 2 of the second class, and 4 of the third class resigned; 3 appointments and 1 reinstatement as pharmacists of the third class, 1 promotion of the second class and 3 of the third class were made, leaving at the close of the fiscal year 45 pharmacists on duty, as follows: Pharmacists of the first class, 16; second class, 20; third class, 9.

Pilots and marine engineers.—At the beginning of the fiscal year there were on duty 14 pilots and 22 engineers; 1 pilot resigned and 3 were appointed; 5 marine engineers were separated from the service and 4 were appointed. The number on duty at the close of the fiscal year was as follows: Pilots, 16; marine engineers, 21.

HOSPITAL AND QUARANTINE ATTENDANTS.

At the beginning of the fiscal year 1,184 attendants were employed at the various marine hospitals, quarantine stations, and on epidemic duty, including 74 such employees on duty in the Philippine Islands, and at the close of the fiscal year there were 978 so employed, as follows:

Branch of service in which employed.	In service July 1, 1908.	Appointed during year.	Separated from service.	In service June 30, 1909.
Marine-Hospital Service.....	441	601	593	449
Quarantine (including Porto Rico and Hawaii).....	298	223	162	359
Epidemic.....	445	508	783	170
Total.....	1,184	1,332	1,538	978
Philippine Islands.....	74	22	22	74

RECAPITULATION.

Commissioned medical officers	128	Medical inspectors	2
Chiefs of divisions, Hygienic Laboratory	3	Internes	10
Assistant pharmacologists	2	Pharmacists	45
Artist	1	Pilots	16
Technical assistants	8	Marine engineers	21
Sanitary inspector	1	Attendants	978
Quarantine inspector	1	Laborers	9
Acting assistant surgeons	279	Total	1,504

BOARDS CONVENED.

Seventy-three boards were convened at different times and at various stations throughout the United States for the physical examination of officers of the Revenue-Cutter Service and applicants for entrance therein. Three boards were convened for the examination of passed assistant surgeons to determine their fitness for promotion to the grade of surgeon, and five for assistant surgeons to determine their fitness for promotion to the grade of passed assistant surgeon. Seven for the physical examination of detained aliens; three for the examination of pharmacists, to determine their fitness for promotion to a higher grade; four for examination of applicants for entrance as assistant surgeons; and one for a special physical examination of a surfman of the Life-Saving Service.

The bureau sanitary board has been convened in 25 sessions to pass upon reports of inspections of establishments engaged in the manufacture of vaccines, serums, toxins, etc., prior to recommending a license; and to pass upon advertised remedies and appliances to determine if said advertisements should be excluded from the mails.

INFLUENCE OF THE CORPS IN MEDICAL AND PUBLIC-HEALTH ACTIVITIES.

A feature of the service worthy of comment is the intimate relation maintained by the medical corps with the great body of the medical profession of which they are a part, and their active participation in associations to advance scientific knowledge and sanitary reforms.

This is in keeping with the repeatedly avowed policy of the bureau. Encouragement is given to officers to attend medical societies, to write for the medical journals, and to assist lay movements in the interest of public health. These officers, members of the medical profession of the United States, are its representatives in our civil government, and the effort has been to impress upon the profession that the corps is not a body separate and apart, but rather is a part of itself.

No medical corps can retain its vigor and efficiency independent of the thought and experience of the great army of coworkers in the profession.

There is likewise an obligation on the part of the corps to give to the profession and to the public the benefit of its experience and investigations—results obtained in its special line of study under special opportunity of observation and facilities for scientific research.

Aside from the subjects treated in the bulletins and brochures published officially by the bureau, there are facts of real interest developed in service work which may not be chronicled among official transactions, but which are worthy of publication in the medical or lay press. As showing the influence of the corps upon medical and sanitary science in this auxiliary form, it may be stated that 128 articles of the above character have been contributed by 54 officers during the period covered by this report. These do not include a large number of unpublished addresses and lectures.

In the healthy interchange of thought and inspiration between the corps and other members of the medical profession, no medium is so valuable as the association meetings where professional men are brought closely together. The value of these meetings lies not only in the formal discussion of the subjects on the program, but in the information obtained through informal conversation upon special topics of mutual interest. These meetings are very profitable.

Following is a list of meetings attended by officers of the service during the period covered by this report, and at which they presented formal papers and took active part in the discussions. In nearly every instance the attendance has been by special and even urgent request of the officers of the association. The exceptions are the meetings of those societies of which the service officers are regular members.

International Congress on Tuberculosis, Washington, September 21–October 3, 1908.

International Conference on Tuberculosis, Stockholm, July 8-10, 1909.

International Tuberculosis Exhibition, Philadelphia, March 12, 1909.

International Bureau of Public Hygiene, Paris, November 4, 1908.

International Congress of Applied Chemistry (Seventh), London, May 27-June 2, 1909.

International Fisheries Congress, Washington, September 22-26, 1908.

International Commission for the Revision of the International Classification of Diseases and Causes of Death, Paris, July 1-3, 1909.

International Congress on Alcoholism (Twelfth), London, July 18-24, 1909.

International Congress Against Leprosy (Second), Bergen, Norway, August 16-19, 1909.

International Medical Congress (Sixteenth), Budapest, August 29-September 4, 1909.

Pan-American Medical Congress (Fifth), Guatemala, August 6-10, 1908.

Conference of State and Provincial Boards of Health, Washington, June 4-5, 1909.

American Medical Association, Atlantic City, June 8-11, 1909.

American Public Health Association, Winnipeg, Canada, August 25-26, 1908, and Richmond, Va., October 19-21, 1909.

Legislative Council, American Medical Association, Washington, January 18, 1909.

Council of Medical Education, American Medical Association, Chicago, April 5, 1909.

Council of Pharmacy and Chemistry, American Medical Association, Chicago, November 12-13, 1909.

Lake Michigan Water Commission, meetings at Chicago, Grand Rapids, and Indiana Harbor.

Committee on Revision of Nomenclature of Diseases, Washington, October 22, 1909.

National Association for Study and Prevention of Tuberculosis, Washington, May 13-15, 1909.

Association of Military Surgeons, Atlanta, Ga., October 13-16, 1908; Washington, D. C., October 5-8, 1909.

American Pharmaceutical Association, Hot Springs, Ark., September 7-12, 1908; Los Angeles, Cal., August 16-21, 1909.

Southern Commercial Congress, Washington, December 7, 1908.

American Academy for Advancement of Science, Baltimore, December 31, 1908.

Medical Society of the Missouri Valley, St. Joseph, Mo., March 18, 1909.

American Academy of Political and Social Science, Philadelphia, April 16, 1909.

American Association of Pathologists and Bacteriologists, Boston, April 8, 1909.

Association of Medical Milk Commissioners, Atlantic City, June 7, 1909.

Southern Medical Association, Atlanta, November 10-12, 1908.

Seaboard Medical Association, Washington, N. C., December 1-3, 1908.

American Physiological Society and the American Society of Biological Chemistry, Baltimore, December 28, 1908.

Society of American Bacteriologists, Detroit, December 30, 1908.

American Chemical Society, Detroit, June 29–July 2, 1909.

American Society of Tropical Medicine, Washington, April 10, 1909.

Arkansas State Medical Society, Pine Bluff, May 21, 1909.

Idaho State Medical Association, Boise, October 8–9, 1908.

Minnesota State Sanitary Association, Winona, October 12, 1909.

Minnesota State Medical Society, Winona, October 13, 1909.

Conference of Sanitary Officers of State of New York, Rochester, November 10–12, 1909.

North Carolina State Medical Society, Asheville, June 15, 1909.

North Carolina Convention of Mayors, Charlotte, November 17–18, 1908.

Ohio State Medical Association, Cincinnati, May 5–7, 1909.

South Carolina State Medical Association, Summerville, April 20, 1909.

Virginia State Medical Society, Richmond, October 22, 1908.; Roanoke, October 5–8, 1909.

Virginia State Conference on Charities and Corrections, Lynchburg, May 19, 1909.

Washington State Medical Association, Walla Walla, September 9–11, 1909.

Washington, Oregon, and Idaho, Medical Association of, Seattle, July 20–23, 1909.

Association for Prevention of Tuberculosis, Washington, December 4, 1908.

Columbia University, New York, March 15, 1909 (lecture).

Atlanta School of Medicine, Atlanta, Ga., April 26, 1909.

Philadelphia Maritime Exchange, Quarantine Conference, June 25–26, 1909.

Political Economy Club, Baltimore, November 8, 1909.

Chicago Medical Society, Chicago, November 24, 1909.

Cleveland Academy of Medicine, Cleveland, November 19, 1909.

At a number of the foregoing meetings resolutions were passed relating to the service, some of which are mentioned below.

American Public Health Association, August 25–28, 1908:

Resolved by the American Public Health Association, That it heartily recommends to the American Congress the passage of such legislation as is intended to enlarge the scope and increase the efficiency of the Public Health and Marine-Hospital Service. To this end the association believes the powers of the service should be increased; that provisions shall be made for the retirement under pay of the members of the service; and that the salaries of the said members should be made commensurate with the medical services of the army.

The secretary shall send a copy of this resolution to the chairman of the House Committee on Interstate and Foreign Commerce and to the corresponding committee in the Senate.

Idaho State Medical Association, October 8–9, 1908:

Resolved by the Idaho State Medical Association, That it heartily recommends to the Congress of the United States the passage of such legislation as is intended to increase the public health duties and the efficiency of the Public Health and Marine-Hospital Service of the United States. To this end this association believes the powers of the service should be increased; that provi-

sions should be made for the retirement under pay of the commissioned officers of the service; and that the salaries of the said officers should be made commensurate with the Medical Corps of the Army.

Be it further resolved, That this association advocates the formation of a national department of public health, to be developed from the Public Health and Marine-Hospital Service. That the secretary shall send a copy of this resolution to the chairman of the Senate Committee on National Quarantine, the House Committee on Interstate and Foreign Commerce, and to the United States Senators and Representatives in Congress from the State of Idaho.

Legislative Council of the American Medical Association, January 18, 1909:

At this meeting two bills (S. 6101 and S. 6102) relating to the service were considered. The council unanimously resolved to indorse the personnel bill and also the public health bill with the addition of an amendment in effect that, in addition to investigating the methods of propagation and spread of various diseases enumerated in the bill, the Public Health and Marine-Hospital Service should enforce means for the prevention of the same. A second amendment to the public health bill provided that the President should be empowered to transfer the various existing health agencies now in the Government within the period of one year to a single department.

Conference of State and Provincial Boards of Health, June 4-5, 1909:

I.

Whereas tuberculosis is specially prevalent among the colored people of the country, threatening not only their own race with decimation if not final extermination, but constituting a serious menace to the whites with whom they come in contact; and

Whereas the United States Public Health and Marine-Hospital Service has devised the best scheme yet suggested of meeting this problem by the organization of state colored antituberculosis leagues, with branch leagues in all the colored churches: Therefore be it

Resolved, That the conference indorses the plan of campaign, and urges its members within whose jurisdictions it is a practical question to promote as far as possible its inauguration and success.

II.

Whereas in the opinion of the National Conference of State and Provincial Boards of Health of North America the work of the United States Public Health and Marine-Hospital Service has been and is increasingly of very great value to the cause of public health and should in consequence be fostered and encouraged: Therefore be it

Resolved, That the association respectfully recommends to the United States Senate and House of Representatives the enactment of legislation enlarging the powers and increasing the duties of the Public Health and Marine-Hospital Service, and for the improvement of the status of the personnel so that they will be put on a parity as to compensation, retirement, and other allowances with other medical services of the Government, and that it indorses Senate bills 531 and 1968, respectively, covering the legislation desired.

III.

Resolved, That the Congress of the United States be, and is hereby, petitioned to establish within the limits of the continental United States a hospital for the care and treatment of patients suffering from leprosy, and for the study of that disease, under the control of the Public Health and Marine-Hospital Service, and further, if it lies within the power of Congress to do so, that provision be made for the reception, care, and treatment in said hospital, either at their own expense or at the expense of the several States, of patients who are now, or may hereafter, from time to time come under the care of such States and who may either apply voluntarily for treatment in said hospital or be sent there for that purpose pursuant to state law.

IV.

That it is the sense of this conference that each member of the conference be requested to send to the Surgeon-General of the Public Health and Marine-Hospital Service a complete compilation of the laws of their respective States at the earliest opportunity, and that the Surgeon-General be requested to have them printed; and further, that the secretary be instructed to communicate with the Surgeon-General and cooperate with him in every possible way in compiling this document.

In the following pages I have discussed some of the problems with regard to public health. Though prepared for presentation before the College of Physicians and Surgeons of New York, the discussion was intended for wider presentation and relates to principles and lines of activity with regard to the public health necessary to be considered in the administration of the service.

PUBLIC HEALTH PROBLEMS.

In considering public health problems of the nation it is obvious that two kinds of problems must be considered—the sanitary and the legal. Of the two the legal problems are the least settled. Our scientific knowledge of disease and the methods of prevention are far in advance of legal provision and executive administration.

It will be interesting and useful at the outset to consider the public health problems of the past, for when we reflect that many of them are past problems it gives courage in the solution of those at present pending.

It is but a comparatively short time since smallpox, typhus fever, cholera, yellow fever, plague, and leprosy were problems of a scientific as well as legal character. When the last epidemic of cholera visited this country, in 1878, its true nature was unknown. The true character of yellow fever was also unknown until 1898, and the same may be said of plague until 1894. These diseases for centuries baffled the wisdom of men, inspired terror, which naturally accompanied ignorance concerning them, and gave rise to innumerable investigations, theories, and procedures which were of no avail. One has but to examine the literature regarding plague to be impressed with the horrors which it entailed from the fourteenth to the eighteenth centuries, inclusive. Hecker calculates that one-fourth the population of Europe, or 25,000,000 persons, died in all of the epidemics in the fourteenth century. The literature on this subject is appalling in extent. A mere enumeration of titles, with authors, covers 40 pages royal quarto size of the Index Catalogue of the Library of the Surgeon-General's Office of the United States Army. But now we feel the power of mastery over these great epidemic diseases. Their mystery has been solved, and so has the problem of their extermination.

The quarantine problems connected with these diseases, meaning the legal measures necessary to prevent their introduction and spread, have also been solved, and this *pari passu* with our knowledge of the diseases to be prevented.

The quarantine of to-day is not deserving of the same name as the first quarantine which was imposed at Venice in 1403 against the bubonic plague. Vessels were simply held at a remote distance from shore and the disease thereon allowed to run itself out. Quarantine to-day means the isolation of the sick, the detention under observation of those exposed during a period equal to the incubative period of the disease, and the sanitation of the ship. With the removal of infected or suspected persons and material the ship may be disinfected and released, suffering thus scarcely any detention at all. In the old colonial days each colony had its quarantine regulations, and after the formation of the Union quarantine was left to the care of the state governments and by the latter to county governments or to municipalities.

The first national quarantine law in the United States was passed in 1878, but, aside from bestowing power to aid state governments, it had little effect. Until 1893 each State had its own individual requirements. Different cities in the same State had different requirements. One city, in order to divert trade from its neighboring rivals, would be less exacting than the latter. Before the civil war conventions were frequently held of the quarantine officers of our Atlantic seaboard, with a view to establishing harmony of action, but they failed, and it was not until 1893 that a national quarantine law was passed by Congress authorizing national regulations for all quarantine, uniform in character and, if not enforced by the States, to be enforced by the National Government. Relief from the previous quarantine evils immediately followed, and in 1906 an additional quarantine act was passed, under which the Federal Government has obtained control of the stations and of the administration of nearly all the quarantine in the United States.

Another problem practically solved or being solved is that connected with immigration. Until the passage of the immigration law of 1891 there was no adequate hindrance to the influx of immigrants afflicted with disease other than those which were quarantinable. Our cities and towns were receiving immigrants afflicted with loathsome contagious diseases, particularly favus and trachoma, but under laws and regulations this invasion has been practically stopped, and many other diseases of like nature are regularly excluded.

Now, while the foregoing public-health problems have been practically solved, new public-health problems have come into the foreground, or at least are brought forward for more pressing consideration. This is due to the growth of the country. Diseases which were formerly not considered necessary for public recognition and action now call very loudly for it. But before considering these diseases and the sanitary problems connected therewith, let us study briefly the legal status, or the measures affecting them provided by law. In so doing it will be convenient to comment, first, on the relations of our nation to other nations in matters of public health, and afterwards upon the relation of the National Government to the States.

INTERNATIONAL RELATIONS.

With regard to immigration, it has been repeatedly urged and included in bills introduced in Congress that the most effective method of barring immigrants afflicted with loathsome or contagious diseases would be to place medical officers in the foreign ports of departure. But foreign governments have objected to this, and at present it seems impracticable. Indirectly, at some foreign ports, however, the desired end is brought about through the quarantine act of February 15, 1893, which authorizes the President to detail medical officers in the offices of the United States consuls to enforce the Treasury regulations upon vessels leaving for the United States to prevent bringing to this country persons or merchandise infected with quarantinable disease. Officers are thus stationed now at Libau, Naples, and Calcutta; and in China, Japan, South America, Central America, Cuba, and other islands in the West Indies, and at any foreign port where contagious disease is rife officers are promptly sent. These officers at many ports, by request of the steamship companies and the Immigra-

tion Bureau, examine emigrants and advise the steamship companies as to those whom they should not bring. The steamship companies are thus protected from infringement of the law and the imposition of the consequent penalty.

But our international relations with regard to the public health have recently been extended beyond the mere question of quarantine and immigrants, and it is noteworthy that the Congress of the United States has recently signified its interest in these matters by three appropriations in the "act making appropriations for the diplomatic and consular service," approved March 2, 1909.

The appropriations are as follows:

INTERNATIONAL OFFICE OF PUBLIC HEALTH (PARIS).

For the payment of the quota of the United States for the year 1909 toward the support of the International Office of Public Health, created by the international arrangement signed at Rome, December 9, 1907, in pursuance of article 181 of the International Sanitary Convention, signed at Paris on December 3, 1903, three thousand dollars.

INTERNATIONAL SANITARY BUREAU.

(This means the International Sanitary Bureau of the American Republics, located at Washington.)

For the annual share of the United States for the maintenance of the International Sanitary Bureau for the year 1910, \$2,830.79.

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

To enable the Government of the United States suitably to participate in the Twelfth International Congress of Hygiene and Demography, which will be held at the city of Washington, D. C., in 1910, in pursuance of the invitation extended by the President of the United States, in virtue of the joint resolution of the Congress thereof, approved February 26, 1907, and to meet the expenses that will actually and necessarily be incurred by the United States by reason of such invitation and meeting, ten thousand dollars, or so much thereof as may be required.

The Congress of Hygiene and Demography, just referred to, is a voluntary organization; that is, it has no official relations with the nations from which the delegates come. Delegates, however, are officially appointed to represent the several governments, but no powers are delegated to them.

The other two organizations mentioned above are strictly official, and treaties or conventions establishing them have been ratified by the Senate of the United States, as well as by the other governments represented therein.

The International Sanitary Bureau of American Republics at Washington was founded by the International Conference of American States held in the City of Mexico in 1901. That conference also called for international sanitary conventions, which are now held every two years. Two have been held in Washington, and a third, a little more than a year ago, in the City of Mexico. The next one is to be held in Costa Rica beginning December 25, 1909. The object of the conventions is to freely discuss all matters relating to the public health, and particularly those which affect the American Republics, and the object of the International Sanitary Bureau is to encourage the execution of the resolutions or agreements de-

cided upon by the conventions. The convention held in Washington in 1905 drew up a treaty with regard to the quarantine treatment of cholera, plague, and yellow fever, which was signed *ad referendum* by the official delegates, and has since been confirmed by practically all of the American Republics. At the meeting in Mexico City in December, 1907, action was taken which has brought the International Sanitary Bureau at Washington into relations with the International Office of Public Health at Paris.

The International Office of Public Health at Paris was formally inaugurated November 10, 1908. It is the outgrowth of international sanitary conferences at Rome, Venice, and Paris, with regard to the bubonic plague. The following Governments are represented: Belgium, Brazil, British India, Egypt, France, Great Britain, Holland, Italy, Portugal, Roumania, Russia, Spain, Switzerland, and the United States.

Each of these Governments has agreed to pay its *pro rata* of the expenses necessary to maintain the international office. Article IV of the organic statutes states as follows:

The principal object of the office is to collect and bring to the knowledge of the participating States facts and documents of a general character interesting to public health, especially as concerns infectious diseases—notably cholera, plague, and yellow fever—as well as the measures taken to combat these diseases.

It is believed that the full exchange of ideas that will take place at the semiannual gathering of the governing committee, composed as it is of men of the highest authority and influence, will have a beneficial effect upon the march of international sanitation, and that as a central clearing house of sanitary information the bureau will become of the highest importance, both in the quarantine and the internal sanitary administration of the various countries of the world.

It will thus be seen that these international sanitary bodies, strictly official in character, may reasonably be expected to have a stimulating effect, and possibly a still more aggressive effect upon sanitary reforms in the several nations.

How to make the international sanitary agreements and organizations have a practical bearing upon the sanitary conditions, even local conditions, is one of the great problems under consideration today. Whether an affirmative solution is possible is a question, but there is reason to believe that affirmative results can be obtained. In any event the effort is a worthy one, and the effect can only be good.

With regard to the American Republics, the matter has gone so far as to be included in resolutions adopted at the Third International Conference of American States, which met at Rio de Janeiro in July, 1906. That conference recommended to the countries represented the following, *viz*:

The adoption of measures tending to obtain the sanitation of the cities, and especially of the ports, and to attain as far as possible to a better knowledge of the greater observance of hygienic and sanitary principles.

The conference further directed that the respective delegates to the next International Sanitary Convention be instructed to solve the question of “practical means of rendering effective” the above recommendation.

The action of the conference was the result of instructions given by Secretary Root to the American delegates, and which were included

in a letter written by myself by invitation of Secretary Root, suggesting considerations regarding hygiene and sanitation and quarantine which might appear worthy of being brought before the Rio conference. The argument was that quarantine and quarantinable diseases heretofore considered at international sanitary conventions should now be put to one side as no longer requiring international consideration; and international deliberations should now take up matters of hygiene and sanitation, even though it is admitted that the activity of the National Government in local sanitation is more difficult in some Republics than in others. It was argued that while unhygienic conditions are local, they give rise to diseases which spread from one country to another, and then become the care of the national governments, and that the latter should therefore find some means of exercising effective influence with regard to local conditions.

It was further argued that this influence should be exerted first upon seaport cities and towns, since these are the connecting points between nations.

This problem is still before the International Sanitary Conventions of the American Republics and the International Sanitary Bureau.

RELATION OF NATIONS TO STATES.

Having thus discussed international relations, we must now consider the relation of the nation to the States in public-health matters. In the earlier days of the Republic legal problems of this nature seldom arose, if we except the quarantine question, but since, as before stated, diseases that were not formerly considered necessary for public recognition now call very loudly for it, so legal questions relating thereto involving new examinations and decisions are now before us. In other words, sanitary and legal problems are constantly changing and new questions are arising for determination.

In attempting to determine what is the proper relation of the nation to the state in the matter of public health, it is necessary to have as clear an understanding as possible of our ultimate object or what ends we are striving to attain. These may be broadly enumerated as follows: (1) To diminish the death rate; (2) to extend the period of life; (3) to decrease physical suffering; (4) to increase physical and mental stamina.

To attain these ends requires a warfare upon disease, particularly disease of a communicable nature. The greater epidemic diseases, viz, cholera, yellow fever, smallpox, typhus fever, and plague, are not here considered, for they can be successfully fought with our present scientific knowledge and lawful regulations. But other diseases do require consideration, both as to their character and the best legal arrangements for combating them. Among the more important requiring immediate attention are the following: Tuberculosis, typhoid fever, malaria, measles, pneumonia, scarlet fever, hookworm disease, pellagra, cancer, and insanity. And the topics to be considered in connection with their eradication are as follows: vital statistics (the bookkeeping of public health), water pollution, milk supply and pure food, sanitation and hygiene, mental hygiene, scientific investigation, and publication.

Now, in the struggle to eliminate these diseases and in providing means relating to the topics just mentioned, how much shall devolve upon the States, how much shall be imposed upon the General Government? And here arises the old question as to the police powers of the States and the restrictions imposed upon the National Government by the Constitution. There is evidently a growing sentiment that the National Government should do far more than it is now doing toward the protection of the public health, and there is likewise a strong feeling that too much is expected of the National Government, and that there is a tendency to allow or to call upon the Federal Government for service which is properly imposed on the States themselves and a willingness to surrender even state rights for the sake of financial assistance. There is danger of an extreme view in each case, and it appears to me that as regards the public health the limitations of the Constitution are the very limitations that the best policy would dictate. I do not admit that the limitations of the Constitution are as narrow as is claimed by some strict constructionists. Much may be done under the Constitution that at first blush seems impossible, and modern conditions of life make it imperative that the National Government should assume its responsibilities in sanitary matters affecting more than one State or Territory. On the other hand, measures evidently beyond the powers granted by the Constitution to the Federal Government would be unwise measures, weakening, as they would, the independence and self-reliance of States and municipalities, which would lead to a weakening of our national character.

In his address at Gettysburg, June 1, 1908, Senator Knox, of Pennsylvania, now Secretary of State, in commenting on the dangers of peace, states as follows:

Sometimes a portion of the people, strong by reason of their numbers or by reason of their zeal and activity, and interested in the accomplishment of laudable aims, become impatient and restive under the checks and balances and boundaries which control and harmonize our system, and may therefore oppose what they want through the methods they propose. Recently this tendency seems to me to have threatened seriously to disturb the just relations between the state and federal governments. Impatient of the difficulties and delays which may attend the action of separate States in the accomplishment of their objects, some of the people have seemed to feel that by an assumption of federal power or by ignoring state power their aims could be speedily and fully obtained.

But the genius of our Constitution, the supreme equity of our form of government, the balance wheel of our system, is that each of the dual governments shall keep within its own sphere, untrammelled and uncontrolled by the other.

The Hon. James A. Tawney, chairman of the Committee on Appropriations, House of Representatives, in his memorial address on the battlefield of Gettysburg, May 30, 1907, states as follows:

In the early part of the nineteenth century there was fear and danger that the union of the States was as a rope of sand and would fall apart. To-day there is more reason to fear that the several States and the local self-government which they represent will, for all practical purposes, disappear from our politics as distinct entities and be swallowed up in an all-embracing federal power. The States not only seem inclined to allow, but in many instances are anxious voluntarily to surrender to the Federal Government the discharge of duties and the exercise of powers and privileges reserved to them by the Constitution, especially when the exercise of those powers involves the expenditure of money. They are also to-day either soliciting or acquiescing in a degree of federal supervision over their domestic affairs that less than half a century ago would have led to revolution had the Federal Government attempted to force such supervision upon them.

Furthermore, Mr. Tawney, on March 4 of the present year, commenting on the greatly increased expenditures of the General Government, declared as follows:

An analysis of our expenditures during the past decade proves conclusively that the primary cause for this increase is a tendency on the part of our people toward militarism and in favor of the exercise by the Federal Government of rights and functions belonging exclusively to the States.

These thoughts expressed by well-known leaders in our public life must be given due weight in considering the relation of the National Government to the States in matters of public health.

THE CONSTITUTION.

It would be a sad reflection, however, that under our form of government as much could not be done for the public health by the national and state governments as ought to be done to bring about the necessary results. It has sometimes been asserted that in these matters the autocratic governments of the Old World have an advantage over the self-governing republics, but further study of the subject will show that their advantages are not superior. As stated before, it is believed that the Constitution does permit national legislation of the necessary scope and character.

The principal laws on the national statute books which have a bearing on public health are based upon, or are carefully in accord with, that clause of the Constitution which gives the right to Congress to regulate commerce between the States. There is another clause of the Constitution which, as will be seen presently, may have an important bearing on national health legislation, particularly with reference to the pollution of interstate waters. I refer to the clause empowering the federal courts to settle controversies between the States.

It has also been claimed that under the "general-welfare" clause of the Constitution certain beneficent institutions can be organized and maintained by the National Government, but a strict constructionist will inform you that the United States Government can only legislate in accordance with powers expressly delegated by the Constitution and that the "general-welfare" clause of the Constitution applies as a qualifying clause to the specified prerogatives—that the latter are only granted when necessary to the general welfare. Still others will declare that nevertheless the "general-welfare" clause has a meaning which can not be ignored and whose influence has been felt in legislation.

WATER POLLUTION.

Recurring now to the specified diseases hereinbefore mentioned as furnishing problems for the national as well as state governments, viz, tuberculosis, typhoid fever, malaria, pneumonia, measles, scarlet fever, pellagra, hookworm disease, cancer, and insanity, and their corresponding topics, vital statistics, water pollution, milk supply and pure food, sanitation and hygiene, mental hygiene, scientific investigation, and publication, it would be interesting to discuss each of them; but it must suffice at present to comment at length on only one, viz, water pollution, which presents probably greater

difficulties, both of a sanitary and legal character, than the others. I shall not attempt to make an exhaustive statement as to the pollution of the water supplies of the United States, nor to give statistics showing the tremendous economic loss, as well as the loss of human life, caused by such pollution. To do so would require a special article dealing with this subject alone. In general, it may be said that the legal problem involved is more difficult of solution than the sanitary one, although to provide measures which will prevent the pollution of streams, whether by diverting the sewage of cities from the streams or requiring a purification of sewage before being emptied into a stream, and to insure purity of drinking water, implies sanitary study and research and questions of engineering of the most profound character. But the legal problem involved, so far as national action is concerned, is now engaging the careful thought of men eminent in the legal as well as the medical profession. Among those who are at present giving most earnest attention to this subject is the Hon. George Shiras, 3d, former Representative in Congress and son of Justice Shiras, formerly of the Supreme Court of the United States, and himself a lawyer of distinction. By request he has furnished me with the following statements bearing on this subject.

The right of a government to regulate and control the extent and character of water pollution is a primary one, and may in the United States be divided into two general classes:

First. Local waters, or those lying wholly within the confines of a single State

Second. Interstate waters, or those traversing or lying within the territory of two or more States.

In the first division the sanitary jurisdiction over local waters is limited to the state courts, and all remedial or corrective legislation is vested solely in the lawmaking body of the State.

In the second division, however, the jurisdiction over interstate waters may be a concurrent one of the State and Federal Governments, or at times when the conflicting interests of the States in such common waters requires the intervention of a final arbitrator, the Federal Government becomes supreme in its determination of what constitutes an unreasonable and unnecessary pollution of waters common to two or more States.

On the part of many it has been frequently asked upon what legal grounds the National Government is able to prevent the pollution of interstate waters. And yet the answer seems a simple one. In the year 1901 a bill was filed in the United States Supreme Court by the State of Missouri against the State of Illinois (vol. 180, U. S. Rep., p. 208) alleging that the construction and subsequent use of the Chicago Drainage Canal would so pollute the waters of the Mississippi River as to seriously impair the health of the citizens of St. Louis and adjacent communities within said State. To this bill a demurrer was filed, admitting that even if these allegations were true, there existed no jurisdiction in the Federal Government to prevent such pollution; the position being taken, in effect, that it was no concern of the Federal Government to what extent such interstate waters were polluted or the effect thereof upon the health of the citizens of the United States. Just how this vital question was met by the Supreme Court and how far-reaching the decision was it is only necessary to quote a few lines from the opinion of the court:

"An inspection of the bill discloses that the nature of the injury complained of is such that an adequate remedy can only be found in this court at the suit of the State of Missouri. It must surely be conceded that if the health and comfort of the inhabitants of a State are threatened, the State is the proper party to represent and defend them. If Missouri were an independent and sovereign State, all must admit that she could seek a remedy by negotiation, and, that failing, by force. Diplomatic powers and the right to make war having been surrendered to the General Government, it was to be expected that upon the latter would be devolved the duty of providing a remedy, and that remedy, we think, is found in the constitutional provision we are considering. The allegations of the bill plainly present such a case. The health and comfort

of the large communities inhabiting those parts of the State situated on the Mississippi River are not alone concerned, but contagious and typhoidal diseases introduced into the river communities may spread themselves throughout the territory of the State. Moreover, substantial impairment of the health and prosperity of the towns and cities of the States situated on the Mississippi River, including its commercial metropolis, would injuriously affect the entire State. * * * The bill in this case does not assail the drainage canal as an unlawful structure, nor aim to prevent its use as a waterway. What is sought is relief against the pouring of sewage and filth through it by artificial arrangements into the Mississippi River, to the detriment of the State of Missouri and her inhabitants; and the acts are not merely those that have been done, or which when done cease to operate, but acts contemplated as continually repeated from day to day. The relief prayed for is against not merely the creation of a nuisance, but against its maintenance. Our conclusion, therefore, is that the demurrers filed by the respective defendants can not be sustained."

The effect, therefore, of this decision is plain, viz, that in any case where the pollution of waters common to two or more States is threatened, or where such nuisance is in actual existence, the Federal Government is in a position to pass upon the questions of law and fact and determine the respective equities of the States in such joint waters. And in this connection it matters not that the particular bill referred to was dismissed without prejudice, because, in the opinion of the court, the evidence submitted failed to justify the facts alleged in the bills.

Precisely the same rule was laid down in a more recent case of the State of Kansas against the State of Colorado (U. S. Rep., vol. 206, p. 66, 1907) (see also U. S. Rep., vol. 185, p. 125, 1901), where it was held that an unreasonable use and diversion of the Arkansas River for irrigation purposes by the defendant was subject to control or restriction by injunctive process in the Supreme Court of the United States, while in the later case of the Tennessee Copper Company it was decided by the same court that the unreasonable pollution of the atmosphere by the citizens of one State which resulted in the material injury of the property and health of the citizens of another State was a sufficient ground for a federal jurisdiction in granting adequate relief in the case stated.

It would therefore seem to follow whenever the federal judiciary decide, as a matter of law, that the commission of a certain act by a State, or the citizens thereof, constitutes an impairment of the existing rights of an adjacent State, it comes clearly within the scope of the constitutional provision empowering the federal courts "to settle controversies between the States;" and, logically, it would seem to follow that thereupon there was imposed on Congress the duty of enforcing, by appropriate legislation, the equitable rights of the States in accordance with the principles enunciated by the judicial branch of the Federal Government; or otherwise no controversy between the States over water pollution would ever be settled, in a judicial sense, if the federal courts would have to continue to sit as a *nisi prius* tribunal passing continually upon mere questions of fact and not upon any of the primary questions of law which might be supposed to be involved in the determination of what constitutes the "settlement of controversies between the States."

Therefore when the United States Supreme Court decided that one State may not unreasonably deprive a co-State of its equitable interest in waters common to each, then and thereupon it becomes the duty of Congress to put such prohibitions or restrictions upon the statute books, so that under the administrative activities of the Government they may be so enforced as to prevent the erection and maintenance of nuisances decided to be in violation of the lawful rights of the injured State.

For years this principle has been followed in the prevention or abatement of nuisances affecting navigation upon interstate streams. Although it may be admitted that Congress predicates its alleged jurisdiction over such navigable waters by reason of the power "to regulate commerce among the States," it is nevertheless true that the power to prevent the citizens of one State from doing an act unreasonably interfering with the navigable rights of the citizens of another State was based upon many decisions of the Supreme Court that navigable interstate waters were subject to any and all federal legislation necessary to determine and maintain the rights of the States in these joint waters. When we remember that the word "navigation" is not even mentioned in the Federal Constitution and that the many acts of Congress passed in reference to commerce upon interstate waters have really been based upon the necessity of determining

in advance the conflicting rights of the citizens of different States in such waters, it should be realized that the time has now come when, by precisely similar regulations, Congress should exercise its sanitary control over such waters, since in many respects the objects sought to be attained are of infinitely greater importance to the health and general welfare of the citizens of the United States than the commercial value of any of these interstate waters.

In other words, when any acts of commission or omission, whether relating to navigation, irrigation, the potability or other domestic uses of interstate waters, have been judicially declared to constitute public nuisances per se, and the only questions left open for settlement thereafter are those based upon the existence or nonexistence of certain facts, and on which the existence of a particular nuisance depends, it surely ought to be conceded that Congress has the power, by appropriate legislation, of regulating and determining in advance what are reasonable uses and what are unreasonable uses of waters owned jointly by two or more States, with the right of any aggrieved party to be heard in the courts upon the reasonableness of such federal regulations. Otherwise, if Congress has no such power, we are in the ridiculous plight of only being able to control in a haphazard way the pollution of interstate streams by long and expensive litigation, in which litigation the trial judges can have no sanitary knowledge or technical experience and in which in most cases the individuals, the municipalities, or the States affected by the adverse decision of the court might have avoided the expenditure of great sums of money and useless litigation if they had known, or might have known, in advance just what their legal rights were in and over such common waters.

When therefore the Supreme Court of the United States decides that the pollution of interstate waters is a matter for federal intervention, such an established jurisdiction must include the right of Congress to legislate in accordance therewith.

PUBLIC HEALTH ORGANIZATIONS.

Before closing, a word should be said in regard to the public-health organizations of the country, national, state, and municipal, but time does not permit of their full description. It may be said, generally, that the National Government, aside from its quarantine regulations, its regulations regarding the manufacture of vaccines, toxins, and antitoxins, and those relating to pure food, is engaged chiefly in investigation and dissemination of information and in bringing about cooperation between its own organization and those of the States. The state health organizations are yearly increasing in power and efficiency and many municipalities are working out through proper ordinances and effective administration their health problems.

National law requires a conference to be called each year by the Surgeon-General of the Public Health and Marine-Hospital Service between said service and the representatives of all the state boards of health. Six annual conferences have been held. Other conferences, as occasion may require, are also provided by law between the national health service and all or a part of the state health organizations. The effect of these conferences is an exchange of information, a spirit of cooperation, and the determination of vexed sanitary questions. Their deliberations pertain particularly to administrative measures.

In the strictly scientific work of the Hygienic Laboratory the service has by law the advice of its advisory board, nine in number, composed of scientists eminent in laboratory work, both of other departments of the Government and of endowed institutions. The Public Health Bureau at Washington has six divisions through which the operations of the service, properly classified, are conducted by trained medical officers under the direction of the Surgeon-General.

THE PUBLIC HEALTH MOVEMENT.

Finally, in reviewing this subject, the thought is suggested that in our progressing public health movement we are simply participating in a stage of the evolution of the human being. It would seem that the public health movement, or the status of the public health question, runs parallel with the other great movements connected with the advancement of civilization. It played a subsidiary part in the earliest days when men's energies were chiefly engaged in advancing their temporal welfare or struggling for personal liberty, but at the present time it has relatively a much more significant status.

As shown before, the grosser problems such as the management of the great epidemics, are practically solved. The problems of the ordinary domestic communicable diseases are now solved so far as the diseases themselves are concerned, and the legal problems connected therewith are being solved; and we are actually in another stage of health preservation, signified by sanitation and hygiene, the maintaining of health, and the building up of health. We are just approaching a stage which might be considered that of mental hygiene, which will be followed by one relating more particularly to the improvement of the average intellect, the building up of character, and a further development of the moral and the spiritual.

All these developmental stages are bringing nearer together the different nations of the earth. They tend at least to what some idealists are advocating, a confederation of the world. Surely, in sanitary and in public health matters, the world is one great family, and this fact becomes more pronounced with the agitation and consideration of each of the advanced stages of the public health question.

NEEDS OF THE SERVICE.

The most pressing need of the service at the present moment is the enlargement of its facilities for furnishing information by distribution of its reports and other publications. Requests for these are being constantly received which can not be complied with. This matter has been fully set forth in the foregoing pages (207 and 208).

Other necessities of the service are duly set forth in the bills referred to in the last annual report—one relating to increase of function, the other to the personnel. Both of these bills (S. 6102 and S. 6101, 60th Cong.) were passed by the Senate, and with some amendments were reported favorably by the committee of the House of Representatives, but were not brought to a vote in the House, and failed, therefore, of enactment into law.

The financial statement and the usual statistical tables relating to the professional care of seamen and physical examinations are appended.

I have the honor to remain, respectfully,

WALTER WYMAN,
Surgeon-General.

HON. FRANKLIN MACVEAGH,
Secretary of the Treasury.

APPENDIX.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1909.

PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, 1909.

	Appropriations and repayments.	Expenditures.	Balances June 30, 1909.	Less estimated outstandings.
Pay and commutation commissioned officers and pharmacists.....	\$325,000.00	\$277,561.44	\$47,438.56	\$827.79
Pay other employees.....	390,000.00	352,975.98	37,024.02	100.00
Freight and traveling expenses:				
Appropriation.....	35,000.00			
Repayments.....	127.75	26,244.58	8,883.17	4,206.79
Fuel, light, and water.....	80,000.00	72,768.26	7,231.74	
Furniture and repairs.....	9,000.00	7,610.23	1,389.77	1,194.31
Purveying depot purchases:				
Appropriation.....	45,000.00			
Repayments.....	3,869.18	48,117.99	751.19	604.09
Rent, purveying depot.....	3,250.00	3,250.00		
Maintaining hygienic laboratory.....	15,000.00	13,720.46	1,279.54	1,109.38
Equipment hygienic laboratory.....	10,000.00	9,966.25	33.75	
Maintenance marine hospitals:				
Appropriation.....	235,000.00			
Repayments.....	13,111.37	235,505.87	12,605.50	2,313.57
Care of seamen and other purposes:				
Appropriation.....	140,000.00			
Repayments.....	604.29	116,408.45	24,195.84	63.79
Bureau, books.....	500.00	419.52	80.48	68.12
Stairways, Chicago.....	^a 12,000.00			
Total:				
Appropriations..... \$1,299,750.00				
Repayments..... 17,712.59				
	1,317,462.59	1,164,549.03	140,913.56	10,487.84

^a Transferred to Supervising Architect.

For expenditures by stations, see Statistical Table II.

QUARANTINE SERVICE, 1909.

Amount of appropriations.....	\$420,000.00
Repayments, subsistence furnished, etc.....	935.46
Total.....	420,935.46
Expenditures.....	399,784.03
Balance June 30, 1909.....	21,151.43
Less outstanding liabilities, estimated.....	2,837.77

Expenditures by stations.

Name of station.	Pay and allowances, officers and employees.	Subsistence and miscellaneous.	Medical and hospital supplies.	Total.
Alexandria, Va.....	\$130.00	\$17.22	.....	\$147.22
Beaufort, S. C.....	1,500.00	100.01	.....	1,600.01
Biscayne Bay.....	1,529.67	2.56	.....	1,532.23
Bocagrande.....	3,111.67	567.46	\$9.70	3,688.83
Brunswick.....	3,437.21	1,282.93	24.57	4,744.71
Cape Charles.....	9,037.06	5,426.61	58.45	14,522.12
Cape Fear.....	6,926.01	2,021.10	168.25	9,115.36
Cedar Keys.....	728.00	.....	.....	728.00
Charleston, S. C.....	5,492.50	1,380.74	.....	6,873.24
Columbia River.....	9,913.33	5,503.20	122.10	15,538.63
Coos Bay, Oreg.....	200.00	99.10	1.50	300.60
Cumberland Sound.....	3,600.00	98.38	10.20	3,708.58
Delaware Breakwater.....	4,468.00	2,373.69	24.07	6,865.76
Eureka.....	1,178.50	1,406.08	2.35	2,586.93
Florence, Oreg.....	200.00	.....	.....	200.00
Georgetown, S. C.....	1,200.00	311.93	.....	1,511.93
Gulf.....	11,837.01	5,931.44	225.57	17,994.02
Hawaii.....	29,878.30	9,083.65	127.21	39,089.16
Key West.....	4,080.00	678.92	.....	4,758.92
Miscellaneous.....	.....	579.61	2.75	582.36
Mobile.....	11,024.00	7,710.27	286.95	19,021.22
Newbern, N. C.....	200.00	.....	.....	200.00
New Orleans.....	29,378.83	9,065.62	248.25	38,692.70
Newport, Oreg.....	200.00	.....	.....	200.00
Pensacola.....	8,482.50	3,001.58	147.03	11,631.11
Perth Amboy, N. J.....	1,596.00	1,041.79	.....	2,637.79
Port Harford, Cal.....	350.00	2.19	.....	352.19
Port Inglis.....	310.00	2.88	.....	312.88
Portland, Me.....	7,854.52	1,993.55	12.79	9,860.86
Porto Rico.....	22,982.19	5,927.56	175.98	29,085.73
Port Royal, S. C.....	1,500.00	131.12	.....	1,631.12
Port Townsend.....	14,716.16	1,893.25	23.10	16,632.51
Punta Rassa.....	300.00	.....	.....	300.00
Reedy Island.....	16,382.43	11,391.95	306.71	28,081.09
St. Georges Sound.....	3,200.00	507.91	45.65	3,753.56
St. Johns River.....	1,980.00	583.93	4.25	2,568.18
San Diego.....	6,472.00	3,591.63	.....	10,063.63
San Francisco.....	24,151.93	25,722.82	423.34	50,298.09
San Pedro.....	205.00	182.56	.....	387.56
Santa Barbara.....	290.00	.....	.....	290.22
Savannah.....	10,511.65	6,944.40	79.31	17,535.36
South Atlantic.....	6,041.77	3,264.56	17.36	9,323.69
Tampa Bay.....	6,881.67	3,163.07	146.19	10,190.93
Washington, N. C.....	645.00	.....	.....	645.00
Total.....	274,102.91	122,987.49	2,693.63	399,784.03

PREVENTING THE SPREAD OF EPIDEMIC DISEASES.

Balance July 1, 1908.....	\$711,007.58
Amount appropriated by Congress.....	750,000.00
Total.....	1,461,007.58
Expenditures:	
Foreign medical service, salaries and miscellaneous, China, Japan, Italy, etc., Central and South America, and West Indies.....	\$55,858.73
Panama and Canal Zone, salaries, etc.....	10,394.44
Habana, Cuba (including outlying district), salaries, subsistence, supplies, and miscellaneous.....	22,009.79
Mexico, salaries, supplies, etc.....	7,044.26
Sanitary inspection in United States, salaries, traveling expenses, and miscellaneous.....	12,677.96
Plague suppressive measures, Pacific coast.....	337,403.13
Yellow fever, maintenance of detention camps, precaution against outbreak, salaries, medical and hospital supplies, disinfectants, etc.....	31,783.52
Texas border inspection, salaries and miscellaneous....	5,821.88
	482,993.71
Balance June 30, 1909.....	978,013.87
Less outstanding liabilities, estimated.....	39,000.00

NATIONAL QUARANTINE AND SANITATION.

Balance July 1, 1908.....	\$368, 666. 68
Repayments, subsistence furnished.....	92. 00
Total.....	368, 758. 68
Expenditures for salaries, supplies, improvements, and miscellaneous:	
Mobile, Ala.....	\$35, 841. 96
New Orleans, La.....	6, 662. 95
Rigolets, La.....	225. 00
Atchafalaya, La.....	125. 00
Calcasieu, La.....	125. 00
Miscellaneous.....	34. 69
	43, 014. 60
Balance June 30, 1909.....	325, 744. 08
Less outstanding liabilities, estimated.....	7, 689. 29

SALARIES, OFFICE OF SURGEON-GENERAL, PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, 1909.

Amount of appropriation.....	\$39, 780. 00
Expenditures.....	39, 392. 71
Balance June 30, 1909.....	387. 29

MAINTENANCE LEPROSY HOSPITAL, HAWAII, 1909.

Balance July 1, 1908, reappropriated.....	\$28, 258. 53
Additional appropriation.....	20, 000. 00
Total.....	48, 258. 53
Expenditures.....	24, 442. 67
Balance June 30, 1909.....	23, 815. 86
Less outstanding liabilities, estimated	12, 000. 00

LEPROSY HOSPITAL, HAWAII, BUILDINGS AND EQUIPMENT.

Balance July 1, 1908.....	\$57, 709. 07
Expended July 1, 1908, to June 30, 1909.....	33, 142. 94
Balance June 30, 1909.....	24, 566. 13

LEPROSY INVESTIGATION STATION, HAWAII, 1909-10.

Amount appropriated, act March 4, 1909.....	\$5, 500. 00
Expended July 1, 1908, to June 30, 1909.....	2, 390. 44
Balance June 30, 1909.....	3, 109. 56

APPROPRIATIONS, MARINE HOSPITALS.

Chicago, Ill., act March 3, 1905:	
Balance July 1, 1908.....	\$1, 132. 98
Expended July 1, 1908, to June 30, 1909.....	688. 00
Balance June 30, 1909.....	444. 98
Baltimore, Md., act March 4, 1907:	
Balance July 1, 1908.....	114. 80
Expended July 1, 1908, to June 30, 1909.....	113. 31
Balance June 30, 1909.....	1. 49

Boston, Mass., act March 4, 1907:

Balance July 1, 1908.....	\$5,996.76
Expended July 1, 1908, to June 30, 1909.....	5,810.83
Balance June 30, 1909.....	185.93

Cleveland, Ohio, act March 4, 1907:

Balance July 1, 1908.....	3,000.00
Expended July 1, 1908, to June 30, 1909.....	2,278.05
Balance June 30, 1909.....	721.95

Key West, Fla., act March 4, 1907:

Balance July 1, 1908.....	50.65
Balance June 30, 1909.....	50.65

New Orleans, La., act March 4, 1907:

Balance July 1, 1908.....	24.30
Balance June 30, 1909.....	24.30

New York (Stapleton), N. Y., act May 27, 1908:

Amount appropriated.....	100,000.00
Amount transferred to Supervising Architect.....	100,000.00

APPROPRIATIONS, QUARANTINE STATIONS.

Reedy Island:

Amount appropriated, act May 27, 1908.....	800.00
Expended July 1, 1908, to June 30, 1909.....	800.00

Gulf:

Balance July 1, 1908, act March 4, 1907.....	5,925.00
Expended July 1, 1908, to June 30, 1909.....	916.62
Balance June 30, 1909.....	5,008.38

San Francisco:

Balance July 1, 1908, act March 3, 1905.....	395.17
Expended July 1, 1908, to June 30, 1909.....	9.22
Balance June 30, 1909.....	385.95
Balance July 1, 1908, act June 30, 1906.....	7,365.41
Expended July 1, 1908, to June 30, 1909.....	1,471.15
Balance June 30, 1909.....	5,894.26
Amount appropriated, act May 27, 1908.....	10,000.00
Expended July 1, 1908, to June 30, 1909.....	9,819.25
Balance June 30, 1909.....	180.75

Port Townsend:

Balance July 1, 1908, act March 3, 1905.....	940.00
Balance June 30, 1909.....	940.00

Savannah:

Balance July 1, 1908, act March 4, 1907.....	1.40
Balance June 30, 1909.....	1.40

Pensacola:

Balance July 1, 1908, act March 4, 1907.....	2,612.00
Expended July 1, 1908, to June 30, 1909.....	1,301.31
Balance June 30, 1909.....	1,310.69

San Diego:

Balance July 1, 1908, act March 4, 1907.....	5.00
Balance June 30, 1909.....	5.00

Delaware Breakwater:

Balance July 1, 1908, act March 4, 1907.....	857.00
Balance June 30, 1909.....	857.00

Honolulu:

Balance July 1, 1908, act March 4, 1907.....	390.52
Balance June 30, 1909.....	390.52

Relief of owners tug *Juno*:

Amount appropriated, act March 4, 1909.....	\$376. 50
Expended July 1, 1908, to June 30, 1909.....	376. 50

BALANCES OF APPROPRIATIONS MADE PRIOR TO JULY 1, 1904.

Reedy Island quarantine station, April 28, 1904.....	\$75. 01
San Francisco quarantine station, June 6, 1900.....	4, 777. 06

Port Townsend quarantine station:

Balance July 1, 1908, act March 3, 1901.....	39, 914. 67
Expended July 1, 1908, to June 30, 1909.....	\$18, 825. 63
Outstanding liabilities.....	87. 00
	18, 912. 63

Balance June 30, 1909.....	21, 002. 04
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Savannah quarantine station:

June 6, 1900.....	112. 20
April 28, 1904.....	325. 00

Key West, Mullet Key, quarantine station, June 6, 1900.....	19, 996. 83
South Atlantic quarantine station, June 28, 1902.....	2, 795. 60
Bocagrande quarantine station, June 28, 1902.....	500. 00

San Diego quarantine station:

Balance July 1, 1908, act March 3, 1903.....	6, 000. 00
Expended July 1, 1908, to June 30, 1909.....	5, 251. 58

Balance June 30, 1909.....	748. 42
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ACCOUNTS.

VOUCHERS PASSED FOR PAYMENT AND SETTLEMENT.

The records of the bureau show that 18,480 vouchers were passed during the year. Of this number, 16,128 were sent to the disbursing clerk for payment, 1,082 were transmitted to the Auditor for the Treasury Department for examination and settlement, and 1,270 were examined and referred to the auditor, they having previously been paid by special disbursing agents of the service.

STATISTICAL TABLES.

TABLE I.—COMPARATIVE TABLE OF NUMBER OF PATIENTS ANNUALLY TREATED—1868 TO 1909.

Fiscal year.	Number of sick and disabled seamen furnished relief.	Fiscal year.	Number of sick and disabled seamen furnished relief.
Prior to reorganization:		After reorganization—Continued.	
1868.....	11, 535	1889.....	49, 518
1869.....	11, 356	1890.....	50, 671
1870.....	10, 560	1891.....	52, 992
After reorganization:		1892.....	53, 610
1871.....	14, 256	1893.....	53, 317
1872.....	13, 156	1894.....	52, 803
1873.....	13, 529	1895.....	52, 643
1874.....	14, 356	1896.....	53, 804
1875.....	15, 009	1897.....	54, 477
1876.....	16, 808	1898.....	52, 709
1877.....	15, 175	1899.....	55, 489
1878.....	18, 223	1900.....	56, 355
1879.....	20, 922	1901.....	58, 381
1880.....	24, 860	1902.....	56, 310
1881.....	32, 613	1903.....	58, 573
1882.....	36, 184	1904.....	58, 556
1883.....	40, 195	1905.....	57, 013
1884.....	44, 761	1906.....	54, 363
1885.....	41, 714	1907.....	55, 129
1886.....	43, 822	1908.....	54, 301
1887.....	45, 314	1909.....	53, 704
1888.....	48, 203		

[illegible]

TABLE II.—EXHIBIT OF THE OPERATIONS OF THE SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1909—Continued.

Port.	Total number of sea-men treated.	Patients in hos-pital July 1, 1908.	Admit-ted dur-ing the year.	Total number treated in hos-pital.	Dis-charged.	Died.	Remain-ing in hos-pital June 30, 1909.	Number of days' relief in hos-pital.	Number of sea-men fur-nished office re-lief.	Number of times office re-lief was fur-nished.	Number of persons examined physi-cally, in-cluding pilots.	Num-ber of foreign seamen treated.	Days' hos-pital relief fur-nished foreign seamen.	Amount expended.
New Orleans, La.....	1,473	29	402	431	380	11	40	12,627	1,042	1,567	88	79	969	\$27,693.93
Newport, Ark.....	67		8	8	7	1		38	59	59				436.45
Newport, R. I.....	45	2	28	30	28	1	1	438	15	22	23			1,001.47
Newport News, Va.....	182								182	196	53		7,153	421.88
New York, N. Y.....	3,841	96	1,156	1,252	1,125	22	105	40,991	2,589	4,904	538	456		50,998.17
Nome, Alaska.....	28	4	11	15	12		3	126	13	34				1,359.00
Norfolk, Va.....	2,535	18	562	580	535	15	30	9,753	1,955	2,465	164			15,939.77
North Bend, Oreg.....	2	2	31	33	33			807	18	23	18			1,628.75
Ogdensburg, N. Y.....	52		12	12	9		3	198	40	84				539.29
Oswego, N. Y.....	41		8	8	8			123	33	55				365.85
Paducah, Ky.....	109		8	8	8			100	101	232	2			501.47
Pensacola, Fla.....	124		14	14	13	1		204	110	291	37			739.13
Philadelphia, Pa.....	2,114	19	394	413	399	4	10	5,619	1,701	2,265	121			14,071.18
Philippine Islands.....														
Pittsburg, Pa.....	728	6	150	156	139	5	12	2,689	572	858	50			8,288.20
Ponce, P. R.....	39		8	8	7	1		249	31	75				331.25
Port Arthur, Tex.....	94		19	19	18		1	287	75	95	5			867.20
Port Huron, Mich.....	137		8	8	6		1	158	129	447	41			546.69
Portland, Me.....	704	14	256	270	244	10	16	8,465	434	676	83	12	178	20,694.39
Portland, Oreg.....	612	10	141	151	137	8	6	2,541	461	857	20			8,172.63
Portsmouth, N. H.....	21		5	5	4	1		104	16	23	30			309.15
Port Tampa, Fla.....	214		74	74	70	2	2	1,626	140	397	6			2,415.45
Port Townsend, Wash.....	580	27	376	403	353	8	42	15,450	177	450	19	39	470	19,435.49
Providence, R. I.....	491	3	64	67	62	3	2	894	424	1,050	40			2,363.69
Provincetown, Mass.....	55								55	88	41			232.55
Purveying depot.....														57,794.90
Railroad transportation, freight charges, etc.....														12,247.63
Revenue-cutter vessels, cruises of.....														
Richmond, Va.....	48	1	6	7	7			119	2,411	5,424	248			14,204.20
Rockland, Me.....	193		2	2	2			34	41	103				471.17
Sag Harbor, N. Y.....	6								191	493	16			571.01
Saginaw, Mich.....	89	1	18	19	19			338	6	10				10.00
Salem, Mass.....	9								70	82	3			638.83
San Diego, Cal.....	58		16	16	14	1	1	243	42	75	2			4,668.45
Sandusky, Ohio.....	48		5	5	4		1	69	43	65	19			291.77
San Francisco, Cal.....	2,917	110	1,268	1,378	1,221	42	115	52,254	1,539	2,672	243	74	1,309	53,854.61
San Juan, P. R.....	235	7	88	95	85	4	6	1,911	140	167		1	21	2,091.50

St. Louis, Mo.....	854	23	249	272	238	9	25	9,278	582	751	37	.....	.....	\$10,594.24
St. Paul, Minn.....	13	.....	4	74	4	3	.....	58	9	10	2	.....	.....	363.51
Sault Ste. Marie, Mich.....	202	5	69	74	64	.....	7	1,165	128	139	45	.....	.....	2,196.38
Savannah, Ga.....	850	9	238	267	245	11	11	5,218	583	921	6	.....	.....	15,187.23
Seattle, Wash.....	1,593	12	295	307	295	4	8	4,553	1,286	2,295	283	.....	143	8,886.44
Sheboygan, Wis.....	23	.....	8	307	7	1	.....	180	15	22	11	.....	125	489.30
Sitka, Alaska.....	7	1	1	2	2	.....	.....	50	5	5	.....	.....	.....	193.25
Solomons, Md.....	371	.....	6	6	6	.....	.....	56	365	445	7	.....	.....	574.44
Special duty.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,626.70
Superior, Wis.....	331	5	59	64	59	1	4	1,301	267	449	.....	.....	.....	2,067.45
Tacoma, Wash.....	109	1	28	29	28	1	.....	478	80	132	14	.....	50	1,490.37
Tappahannock, Va., and subports.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.45
Toledo, Ohio.....	360	.....	121	121	117	2	2	1,962	239	723	16	.....	.....	2,311.20
Traveling expenses.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,336.63
Valdez, Alaska.....	215	.....	2	2	2	.....	.....	18	213	380	.....	.....	.....	1,039.98
Vicksburg, Miss.....	240	1	112	113	108	3	2	923	127	231	.....	.....	.....	2,025.50
Vineyard Haven, Mass.....	259	6	83	89	75	3	11	3,585	170	184	7	.....	76	8,195.16
Washington, D. C. (Bureau) Do.....	136	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31,568.49
Washington, N. C.....	100	.....	25	25	22	3	.....	562	111	161	16	.....	.....	2,011.98
Wheeling, W. Va.....	13	.....	18	18	17	1	.....	188	82	97	1	.....	.....	6,218.82
Wilmington, N. C.....	422	.....	9	9	8	.....	1	74	4	9	.....	.....	.....	388.33
Wiscasset, Me.....	1	7	86	93	87	2	4	1,843	329	488	58	.....	19	10,217.21
Cape Charles quarantine.....	21	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	1.00
Cape Fear quarantine.....	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gulf quarantine.....	5	.....	5	5	5	.....	.....	24	.....	.....	.....	.....	.....	.....
Reedy Island quarantine.....	3	.....	3	3	3	.....	.....	34	.....	.....	.....	.....	.....	.....
San Francisco quarantine.....	1	1	.....	1	1	.....	.....	31	.....	.....	.....	.....	.....	.....
San Diego quarantine.....	1	.....	1	1	1	.....	.....	14	.....	.....	.....	.....	.....	.....
Tampa Bay quarantine.....	5	.....	3	3	3	.....	.....	22	.....	.....	.....	.....	.....	.....
Pensacola quarantine.....	6	.....	6	6	6	.....	.....	36	.....	.....	.....	.....	15	.....

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS MADE BY OFFICERS OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1909, EXCLUSIVE OF ALIEN IMMIGRANTS.

Summary of examinations and rejections.	Total.	Pilots.	Merchant seamen.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geodetic Survey.	Light-House Service.	Foreign seamen.	Immigration Service.	Civil Service Commission.	Isthmian Canal Commission.	Philippine Islands.
Total number examined.....	5,380	1,071	364	1,437	1,917	114	91	36	143	132	7	68
Number passed.....	4,985	1,027	333	1,240	1,855	83	90	29	142	117	7	62
Number rejected.....	395	44	31	197	62	31	1	7	1	15	.....	6
<i>Causes of rejection (disease, disability, etc.).</i>												
Abscess coccyx.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Acne.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Albuminuria.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Alcoholism.....	4	.....	.....	2	1	.....	1	.....	.....	.....	.....	.....
Asthma.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Bronchitis.....	5	.....	1	2	1	1	.....	.....	.....	.....	.....	.....
Cachexia.....	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Cancer lip.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Cancer liver.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Cataract.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Catarrh.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Cerebral congestion.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Cerebral hemorrhage.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Cicatrices.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Color blindness.....	27	19	.....	8	.....	.....	.....	.....	.....	.....	.....	.....
Conjunctivitis.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Curvature spine.....	3	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
Cyst thigh.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Defective hearing.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Defective teeth.....	10	.....	.....	7	1	1	.....	.....	.....	1	.....	.....
Defective vision.....	93	24	16	38	10	1	.....	.....	.....	3	.....	1
Deformity.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Deformity of chest.....	2	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
Deviation septum nose.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Diabetis.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Enlargement inguinal ring.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Enlarged testicle.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Enlarged tonsils.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Fever.....	6	.....	1	.....	.....	.....	.....	1	.....	4	.....	.....
Flat foot.....	4	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....
Fracture elbow.....	3	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....
Gastritis.....	4	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....
General debility.....	7	.....	3	2	1	.....	.....	.....	.....	1	.....	.....
Gleet.....	3	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
Goiter.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Gonorrhea.....	17	.....	.....	13	.....	4	.....	.....	.....	.....	.....	.....
Heart:												
Abnormal action of.....	5	.....	.....	1	3	.....	.....	.....	.....	.....	.....	1
Hypertrophy of.....	2	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....
Mitral insufficiency.....	2	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Mitral regurgitation.....	7	1	2	4	.....	.....	.....	.....	.....	.....	.....	.....
Valvular disease of.....	12	.....	.....	10	2	.....	.....	.....	.....	.....	.....	.....
Weakness of.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Heat stroke.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hernia.....	18	.....	1	11	3	3	.....	1	.....	.....	.....	.....
Hip joint, disease of.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Hydrocele.....	2	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....
Hypertrophy of tonsils.....	4	.....	.....	3	.....	1	.....	.....	.....	.....	.....	.....
Incontinence urine.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Inflammation, ear.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation, lymph glands groin.....	3	.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....
Influenza.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Intoxication.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Itch.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Laryngitis.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Locomotor ataxia.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Malaria.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Myopia.....	5	.....	.....	4	.....	1	.....	.....	.....	.....	.....	.....
Nephritis.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Nervous weakness.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Paralysis.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Paraphimosis.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Phimosis.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Piles.....	11	.....	.....	8	3	.....	.....	.....	.....	.....	.....	.....
Pleurisy.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Pneumonia.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Poor physique.....	8	.....	.....	5	2	1	.....	.....	.....	.....	.....	.....

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS MADE BY OFFICERS OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1909, EXCLUSIVE OF ALIEN IMMIGRANTS—Continued.

Summary of examinations and rejections.	Total.	Pilots.	Merchant seamen.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geodetic Survey.	Light-House Service.	Foreign seamen.	Immigration Service.	Civil Service Commission.	Isthmian Canal Commission.	Philippine Islands.
<i>Causes of rejection (disease, disability, etc.)—Continued.</i>												
Rheumatism.....	4		1		3							
Scabies.....	5			4								1
Sciatic neuritis.....	1				1							
Soft chancre.....	1					1						
Sprain of ankle.....	1				1							
Strabismus.....	1			1								
Syphilis.....	14		2	10		1				1		
Tachycardia.....	1					1						
Tonsillitis.....	1									1		
Trachoma.....	1			1								
Tuberculosis.....	10			5		1				3		1
Ulcer palate.....	1					1						
Ulcer penis.....	1			1								
Underdevelopment.....	3			2	1							
Underheight.....	2				2							
Underweight.....	5				5							
Urticaria.....	1					1						
Varicocele.....	19			14		4						1
Varicose veins.....	9			5	4							
Varix.....	1			1								
Vertigo.....	1				1							
Declined examination.....	1			1								

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
TOTAL CASES.....	1,040	13,164	7,638	4,618	429	446	1,073	38,870	53,074
General diseases.....	508	5,260	2,872	1,996	161	223	516	14,569	20,337
Smallpox.....	1	9	9	1				4	14
Cowpox.....		1		1				109	110
Chicken pox.....	2	16	15	2			1	9	27
Measles.....		35	34		1			4	39
Rubella.....								1	1
Scarlet fever.....		8	5	1		1	1	1	9
Relapsing fever.....								1	1
Dengue.....								1	1
Influenza.....	6	220	178	38	2	3	5	662	888
Whooping cough.....	1			1				3	4
Mumps.....	2	32	29	5				23	57
Diphtheria.....	5	15	20					3	23
Cerebrospinal fever.....		2		1		1		5	7
Simple continued fever.....		13	9	4				9	22
Enteric fever.....	50	398	308	45	3	52	40	32	480
Choleraic diarrhea.....		3	3					5	8
Epidemic diarrhea.....		1	1					11	12
Dysentery.....	5	85	49	35		2	4	65	155
Beriberi.....		9	5	3			1	3	12
Malarial fever:									
Intermittent.....	14	915	780	110	13	4	22	1,510	2,439
Remittent.....	9	188	167	13	7	3	7	88	285
Sloughing phagedaena.....		1			1				1
Erysipelas.....	1	38	32	5	1		1	12	51
Pyemia.....		1	1	1				3	4
Septicemia.....		3	2					3	6

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
Tetanus.....		1				1			1
Tubercle.....	240	615	49	374	64	116	252	163	1,018
Syphilis:									
Primary.....	5	40	2	42			1	177	222
Secondary.....	45	579		559	15	5	45	3,287	3,911
Tertiary.....	1	11		8	2		2	42	54
Gonorrhea.....	38	714	366	315	13		58	4,389	5,141
Diseases dependent on animal parasites.....	2	75	58	11	1		7	339	416
Diseases dependent on vegetable parasites.....		9	4	5				44	53
Effects of animal poisons:									
Decayed and poisonous food.....		8	7			1		12	20
Pellagra.....		1	1						1
Effects of vegetable poisons.....		9	4	4			1	44	53
Effects of inorganic poisons.....		9	5	4				5	14
Effects of the presence of foreign bodies.....		9	5	3			1	18	27
Effects of mechanical injuries.....		4	2	1	1			11	15
Effects of heat.....		4	4					3	7
Effects of cold.....		5	4	1					5
Effects of electricity.....		1	1						1
Effects of chemical agents.....		3	2	1				5	8
Effects of excessive exertions and strain.....		1	1					2	3
Alcoholism.....	4	194	158	33	3	2	2	224	422
Rheumatic fever.....	4	117	70	42	3		6	45	166
Rheumatism.....	55	635	395	245	12	3	35	2,433	3,123
Gout.....		1		1				8	9
Osteoarthritis.....		16	3	6	1		6	3	19
Cyst.....	1	2	3					37	40
Sebaceous.....		7	3	3		1		9	16
Bursal.....		1	1						1
New growth, nonmalignant.....	2	39	29	7	1	1	3	118	159
New growth, malignant.....	8	42	7	12	8	16	7	28	78
Rickets.....								1	1
Anæmia.....		10	3	5	2			35	45
Idiopathic anæmia.....	1	1		1		1		1	3
Hodgkin's disease.....		3	2	1					3
Diabetes mellitus.....	1	19		14	1	4	1	34	54
Diabetes insipidus.....		1			1			4	5
Leucocythemia.....		1				1		1	1
Congenital malformations.....	2	5	4	2			1	8	15
Debility.....	3	68	26	30	5	4	6	461	532
Old age.....		1				1		9	10
Malingery.....		6	6					3	9
Local diseases.....	412	5,652	3,243	1,953	247	198	423	19,341	25,405
DISEASES OF THE NERVOUS SYSTEM.....	114	332	89	164	41	29	123	1,044	1,490
Of the nerves—									
Inflammation—									
Neuritis.....	3	34	17	15			5	52	89
Multiple neuritis.....	5	4	1	3	2	1	2	5	14
Of the spinal cord and membranes—									
Cord—									
Inflammation—									
Diffuse.....		8	2	2	1	2	1	2	10
Local.....	1	2	2	1				2	5
Degeneration—									
Of anterior cornua.....	1	3	2			1	1	1	5
Of lateral columns.....	6	5	3	2	2		4	2	13
Of posterior columns.....	16	29	1	20	4	1	19	18	63
Of lateral and posterior columns.....	3	5				5	3	6	14
Of the brain and its membranes—									
Membranes—									
Inflammation—									
Of dura mater.....		4	2	2				1	5
Of pia mater and arachnoid.....	1				1			2	3
Hemorrhage.....		2				2			2

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.							
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.
DISEASES OF THE NERVOUS SYSTEM—Continued.								
Of the brain and its membranes—Continued.								
Brain—								
Inflammation.....								3
Softening.....	1	6		2	3		2	7
Hemorrhage.....	2	9		7		2	2	19
Hyperæmia.....		2	1	1				3
Functional nervous disorders with other diseases of undetermined nature—								
Apoplexy.....		5		1	3	1		
Paralysis—								
Paraplegia.....	4	3	3				4	3
Hemiplegia.....	16	39		25	2	9	19	9
Monoplegia.....	1			1				1
Local paralysis.....		9	1	5	2		1	15
Incomplete paralysis.....	4	12		4	3	1	8	4
Paralysis agitans.....		3		1	2			2
Chorea.....		2		2				2
Spasm.....		2	2					13
Torticollis.....		1	1					9
Facial spasm.....		1		1				
Epilepsy.....		15	1	13			1	29
Tetany.....								31
Vertigo.....		8	6	1	1			
Headache.....		2	2					189
Hyperæsthesia.....		1	1					
Anæsthesia.....		1			1			2
Neuralgia.....	2	66	32	27	6		3	398
Hysteria.....		2		2				4
Nervous weakness.....	1	20	5	13	1		2	180
Hiccough.....								21
Mental diseases—								
Mania.....	10	3	3				10	4
Melancholia.....	4	6	1	4	1		4	9
Dementia.....	26	11		4	1	4	28	1
Mental stupor.....		1			1			
General paralysis of the insane.....	3	3		4	1		1	1
Delusional insanity.....	4	3		1	3		3	1
DISEASES OF THE EYE.....	8	161	69	77	13		10	512
Conjunctivitis—								
Catarrhal.....	3	42	26	17	2			90
Acute.....		12	7	4			1	242
Chronic.....		17	3	14				21
Purulent.....		7	1	5			1	3
Œdema of conjunctiva.....		1	1					11
Degeneration of conjunctiva.....		1			1			3
Keratitis.....		4		2	2			3
Ulceration of cornea.....		19	11	4	1		3	2
Opacity of cornea.....		1			1			
Scleritis.....		2	1	1				
Iritis.....	2	30	13	18			1	29
Choroiditis.....		1		1				2
Glaucoma.....		4	1	2			1	2
Optic neuritis.....	1				1			1
Atrophy and degeneration of optic nerve or papilla.....		2			2			1
Lenticular cataract.....	2	5	2	1	2		2	11
Hemorrhage retinal layer.....		1			1			1
Atrophy retina.....		1		1				
Amblyopia—								
Day blindness.....								8
Ametropia.....								5
Diplopia.....		1		1				2
Squint.....		1	1					1
Inflammation lachrymal gland.....		1		1				
Abscess lachrymal sac.....		2		2				4
Chronic dacryo-cystitis.....		1					1	
Obstruction of nasal duct.....								2

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
DISEASES OF THE EYE—Continued.									
Blepharitis marginalis.....		2		2				17	19
Sty.....		2	2					37	39
Abscess of eyelid.....		1		1				10	11
Eutropion.....								2	2
Œdema eyelid.....								2	2
DISEASES OF THE EAR.....	6	87	45	44	3	1		300	393
Inflammation of the external meatus—									
Acute.....		4	3	1				40	44
Chronic.....		1		1				3	4
Abscess.....		2	1	1				13	15
Accumulation in external meatus of wax or epidermis.....		3	3					106	109
Inflammation of the middle ear—									
Nonsuppurative.....		2	1	1				22	24
Suppurative.....	6	58	24	37	2	1		85	149
Within the mastoid cells.....		12	12					1	13
Perforation of membrana tympani.....		2		1	1			9	11
Anchylosis of ossicles.....								2	2
Obstruction of Eustachian tube.....								2	2
Tinnitus.....								8	8
Deafness.....		1		1				9	10
Necrosis middle ear.....		1		1					1
Mastoiditis.....		1	1						1
DISEASES OF THE NOSE.....	2	18	9	9	1		1	629	649
Inflammation of soft parts.....	1	6	2	4			1	544	551
Inflammation of framework—									
Necrosis.....								3	3
Caries.....								1	1
Diseases of septum—									
Deviations.....		1	1					2	3
Epistaxis.....		4	3	1				10	14
Inflammation of the accessory sinuses.....	1	4	3	1	1			3	8
Inflammation of the naso-pharynx.....		3		3				66	69
DISEASES OF THE CIRCULATORY SYSTEM.....	22	344	53	208	16	39	50	391	757
Pericarditis.....								4	4
Endocarditis.....		2		1		1		2	4
Valvular disease—									
Aortic.....	2	30		27		2	3	16	48
Mitral.....	13	143	3	93	7	28	25	178	334
Aortic and mitral.....		1		1				1	2
Degeneration of heart—									
Fatty.....		10		5		2	3	7	17
Myocarditis.....		16	1	7		1	7	1	17
Hypertrophy of heart.....		2		2				6	8
Dilatation of heart.....		10		7		1	2	3	13
Angina pectoris.....		1		1					1
Disordered action of the heart—									
Abnormal slowness.....		3		2			1	3	6
Abnormal rapidity.....		2		2				6	8
Irregularity.....		16		12	2	1	1	21	37
Arteritis.....		4		2	2			22	26
Degeneration of arteries—									
Arterio-capillary fibrosis.....	2	10		9		2	1	4	16
Aneurism of arteries.....	1	14		10	1	1	3	4	19
Obstruction of arteries—									
Thrombosis.....		2	1	1				1	3
Embolism.....		1		1					1
Phlebitis.....		11	6	4			1	4	15
Varix.....	4	64	40	21	4		3	99	167
Varicose veins.....		2	2					9	11
DISEASES OF THE RESPIRATORY SYSTEM.....	23	716	391	245	29	44	30	2,516	3,255
Hay fever.....		1		1				7	8

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Inflammation of mucous membrane of larynx—									
Catarrhal, acute	1	20	7	14				78	99
Catarrhal, chronic								40	40
Membranous								3	3
Bronchitis—									
Catarrhal, acute	8	272	185	85	8		2	1,849	2,120
Catarrhal, chronic	4	60	7	42	7	2	6	209	273
*Spasmodic asthma	4	52	16	32	1	2	5	84	140
Congestion of lung		3	3					38	41
Hemorrhage of lung—									
Hæmoptysis		5	2	2			1	4	9
Pneumonia	1	138	80	17	2	33	7	7	146
Broncho-pneumonia		12	4	7			1	2	14
Chronic interstitial inflammation		1		1					1
Phthisis—									
Acute	3	2		1	3		1	10	15
Chronic	2	4		2	4			6	12
Tubercular		3		1	2			2	5
Pleurisy—									
Acute		124	82	29	2	4	7	102	226
Chronic		10	4	6				5	15
Empyema		2	1			1			2
Dilatation bronchi		1				1		2	3
Emphysema lungs		6		5		1		3	9
DISEASES OF THE DIGESTIVE SYSTEM.	68	1,460	999	337	78	45	69	6,505	8,033
Inflammation of the lips								7	7
Ulceration of the lips		1		1				6	7
Inflammation of the mouth		4	3	1				60	64
Ulceration of the mouth		1		1				18	19
Inflammation of the dental pulp								4	4
Suppuration of the dental pulp								7	7
Caries of dentine and cementum		5	4	1				114	119
Necrosis of cementum								7	7
Inflammation of dental periosteum		2	2					6	8
Abscess of dental periosteum		10	8	1	1			43	53
Inflammation of gums and alveoli		1		1				17	18
Suppuration of alveoli		2	1	1				28	30
Ulceration of gums and alveoli		1		1				9	10
Caries of the alveoli								5	5
Toothache								92	92
Necrosis alveoli		2		1	1			4	6
Malposition teeth								1	1
Inflammation of the tongue								4	4
Ulceration of the tongue		3	1		2			14	17
Sore throat		10	8	1		1		226	236
Inflammation of tonsils—									
Follicular	3	121	110	12		1	1	405	529
Suppuration		29	24	5				15	44
Hypertrophy of tonsils		7	6	1				12	19
Elongated uvula		1	1					8	9
Inflammation of salivary glands		1	1					7	8
Salivation		1	1					2	3
Inflammation of the pharynx—									
Catarrhal		17	11	5			1	181	198
Granular		2	2					2	4
Follicular								3	3
Fistula, intestines		4	3	1				1	5
Ulceration of pharynx								4	4
Stricture, rectum		4		1		1	2	2	6
Stricture, œsophagus		5		3	1	1			5
Inflammation of the stomach—									
Catarrhal	7	177	94	73	6*	3	8	536	720
Membranous or pellicular								9	9
Ulceration of the stomach—									
Superficial	1	4	2	3				16	21
Perforating		1				1			1

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.							
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.
DISEASES OF THE DIGESTIVE SYSTEM—Continued.								
Hemorrhage of the stomach.....		3	3					5
Dilatation of the stomach.....	1	3		3			1	4
Indigestion.....	3	102	83	17	1		4	1,387
Pyrosis.....		1	1					8
Vomiting.....		1	1					6
Gastralgia.....		8	5	3				24
Loss of appetite.....								39
Stricture, pilorus.....		1				1		
Inflammation of the intestines—								
Enteritis.....	5	51	34	13	4	3	2	55
Typhlitis.....	7	118	83	25	7	1	9	53
Colitis.....		11	3	4	1	1	2	13
Catarrhal.....	2	9	6	4	1			45
Ulceration of the intestines.....		3	2	1				6
Hemorrhage, intestines.....		2		1	1			5
Fæcal accumulation.....		5	4	1				7
Hernia.....	10	238	181	27	22	3	15	507
Obstruction of the intestines.....		3		1		2		1
Intestinal dyspepsia.....		4	1	1			2	31
Constipation.....	1	45	41	3	2			1,263
Colic.....	1	8	4	3		1	1	46
Diarrhea.....	4	118	98	20		2	2	460
Enteralgia.....		2		1		1		4
Inflammation of the rectum.....	1	4	2	3				6
Periproctitis.....	1				1			11
Abscess.....		26	16	8			2	5
Fissure of the anus.....		4	1	2			1	9
Fistula in ano.....	6	46	27	16	5		4	38
Prolapse of the rectum.....		2	2					1
Fistula, gall bladder.....		1			1			
Piles, internal.....	2	33	18	13	1		3	180
Piles, external.....	1	41	28	10	3		1	82
Piles, mixed.....	3	44	34	10	3			32
Pruritus ani.....		2				2		21
Inflammation of the liver, acute.....	1	7	1	2	2		3	35
Inflammation of the liver, acute suppuration.....		2		1	1			1
Inflammation of the liver, acute abscess.....	1	2		1	1	1		
Inflammation of the liver, chronic.....		22		11	5	6		12
Hyperæmia of the liver.....		26	21	2		2	1	146
Atrophy of the liver.....		1				1		2
Hypertrophy of the liver.....								9
Jaundice.....		18	10	7			1	33
Inflammation of hepatic ducts and gall bladder.....	3	18	7	6	3	3	2	15
Calculi.....		2			1	1		6
Biliary colic.....		1		1				14
Inflammation of the peritonæum.....	1	3				3	1	2
Dropsy.....	2	1		2		1		1
Hemorrhage, pancreas.....		1				1		
Perforation, intestines.....		1				1		
Ulcer, rectum.....	1				1			
DISEASES OF THE LYMPHATIC SYSTEM.								
Atrophy of spleen.....	28	428	309	116	7		24	348
Inflammation of lymph glands.....		6	23	7				8
Suppuration.....	4	404	274	106	5		23	106
Hypertrophy of lymph glands.....		4	1	2	1			213
Inflammation of lymphatics—								8
Suppuration.....		13	11	1			1	13
Obstruction lymphatics.....		1			1			
DISEASES OF THE THYROID BODY.								
Goitre.....		4		4				6
DISEASES OF THE SUPRARENAL CAPSULES.								
Addison's disease.....		1		1				1
DISEASES OF THE URINARY SYSTEM.								
Acute nephritis.....	16	206	49	121	8	27	17	540
	3	24	5	15		3	4	18

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at the dispensary.	Total treated in hospital and dispensary.
DISEASES OF THE URINARY SYSTEM—Continued.									
Bright's disease—									
Chronic nephritis.....	6	86	4	59	3	19	7	112	204
Granular kidney.....	2	7		5	1	1	2	28	37
Nephralgia.....		1			1			1	2
Hydronephrosis.....		1	1						1
Pyelitis.....		8	2	4		2		5	13
Abscess—									
Of kidney.....		4	1		1	1	1		4
Perinephritic.....	1			1				1	2
Congestion of kidney.....								2	2
Movable kidney.....		2	1	1				1	3
Calculus in kidney.....		4	2	2				9	13
Calculus in ureter.....		2	2					3	5
Suppression of urine.....		2	1	1				3	5
Hæmaturia.....		3	1	2				8	11
Lithuria.....								19	19
Phosphaturia.....								6	6
Inflammation of bladder—									
Acute.....		43	25	15			3	209	252
Subacute.....		8	1	6	1			19	27
Chronic.....	4	3		5	1	1		28	35
Calculus of bladder.....		2		2				1	3
Irritability of bladder.....		4	2	2				40	44
Retention of urine.....		1		1				6	7
Incontinence of urine.....		1	1					21	22
DISEASES OF THE GENERATIVE SYSTEM.									
Urethritis.....	64	860	545	304	26	8	41	2,078	3,002
Gleet.....		1		1				93	94
Abscess of the urethra.....		2	1	1				32	32
Stricture of urethra—								5	7
Organic.....	9	108	51	50	7	3	6	245	362
Traumatic.....		2		1			1	1	3
Spasmodic.....		3	2				1	8	11
Urethral fistula.....	2	7	4	2			3	3	12
Recto-urethral fistula.....	1			1					1
Extravasation of urine.....		2	1	1					2
Inflammation of the prostate—									
Acute.....		1		1				3	4
Chronic.....		1		1				8	9
Prostatarrhœa.....								3	3
Hypertrophy of the prostate.....	3	18	6	10	2	3		32	53
Posthitis.....		2	2					9	11
Phimosis.....	4	61	48	12	3		2	32	97
Paraphimosis.....		9	8		1			8	17
Inflammation of the penis—									
Of the glans.....		4	2	2				28	32
Abscess of penis.....								14	14
Ulcer of penis.....	4	83	49	32	1		5	266	353
Oedema of penis.....		5	4	1				11	16
Soft chancre.....	31	269	160	123	2		15	884	1,184
Gangrene penis.....		1	1						1
Inflammation of the scrotum.....								9	9
Abscess of the scrotum.....		3	2	1				2	5
Pruritus of the scrotum.....								5	5
Inflammation of the spermatic cord.....		3	3					3	6
Hydrocele of the spermatic cord.....	1	16	10	6	1			14	31
Hæmatocele of the spermatic cord.....								3	3
Varicocele.....		53	44	4	3		2	104	157
Hydrocele of tunica vaginalis.....	1	38	29	7	1		2	34	73
Inflammation of the testicle—									
Acute orchitis.....	7	122	97	29	2		1	137	266
Chronic orchitis.....		3		3				9	12
Epididymitis.....	1	30	17	9	3	1	1	22	53
Abscess of testicle.....		3	2	1				4	7
Spermatorrhœa.....								21	21
Impotence.....								14	14
Congenitally hidden penis.....		1				1			1

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Inflammation of the ovary.....		3		2			1	2	5
Inflammation of the fallopian tube.....		4	1	2			1		4
Displacements and distortions of the uterus.....		2	1	1				3	5
Amenorrhœa.....								5	5
Dysmenorrhœa.....								2	2
DISEASES OF THE ORGANS OF LOCOMOTION.	26	289	165	110	19	2	19	1,291	1,606
Inflammation of the bones—									
Osteitis.....		2	1	1				9	11
Periostitis.....	1	19	11	5	2		2	15	35
Caries.....	1	4	4	1				5	10
Necrosis.....	5	23	13	10	2		3	10	38
Inflammation of joints—									
Acute synovitis.....	4	48	18	19	7		8	63	115
Chronic synovitis.....		15	7	7			1	14	29
Suppuration.....								1	1
Ankylosis.....	2	2		1	1	1	1	5	9
Dislocation of articular cartilage.		2	1	1				4	6
Loose body in joint.....								2	2
Atrophy muscles.....		1			1				1
Necrosis rib.....		1			1				1
Dislocation spine.....	1			1					1
Inflammation spine.....		1					1		1
Caries of the spine.....	1						1		1
Necrosis of the spine.....		1		1					1
Psoas, lumbar and other abscesses.	1	3	1	1	1		1		4
Posterior curvature of spine, angular.....		2		1		1			2
Lateral curvature of spine.....		1		1				2	3
Anterior curvature of spine.....	1			1					1
Inflammation of muscles.....		1	1					9	10
Suppuration of muscles.....		2		2				6	8
Myalgia.....		8	5	3				367	375
Lumbago.....	9	103	77	32	3			659	771
Stiff neck.....		1		1				1	2
Inflammation of fasciæ.....		4	1	3				1	5
Contracture of fasciæ.....		1		1				2	3
Inflammation of tendons.....								7	7
Adhesion of tendons.....		1		1					1
Contraction of tendons.....		6	2	3	1			3	9
Inflammation of sheaths of tendons.....		6	4	2				20	26
Thecal abscess.....		4	3	1				4	8
Ganglion.....		2	2					8	10
Inflammation of bursæ—									
Acute.....		11	6	5				31	42
Chronic.....		2		2				2	4
Abscess of bursæ.....		6	4	1			1	5	11
Bunion.....		1	1					12	13
Flat foot.....		5	3	2				24	29
DISEASES OF THE CONNECTIVE TISSUE.	14	324	234	82	2	2	18	841	1,179
Inflammation.....	3	138	90	40		1	10	324	465
Abscess.....	11	180	140	40	2	1	8	505	696
Gangrene.....		3	3					7	10
Edema.....		3	1	2				4	7
Obesity.....								1	1
DISEASES OF THE SKIN.	21	422	286	131	4	1	21	2,339	2,782
Erythema.....		5	4	1				20	25
Urticaria.....		24	23	1				90	114
Prickly heat.....								39	39
Eczema.....	1	46	26	18			3	445	492
Impetigo.....		4	4					18	22
Pityriasis rubra.....								5	5
Prurigo.....		2	1	1				11	13

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
DISEASES OF THE SKIN—Cont'd.									
Lichen.....		1	1					3	4
Psoriasis.....	1	6	4	3				44	51
Herpes.....		10	10					97	107
Zona.....		8	5	1	1		1	39	47
Dermatitis herpetiformis.....		1	1					19	20
Acne.....		6	1	4			1	99	105
Sycosis.....								18	18
Seborrhœa.....								5	5
Chloasma.....								4	4
Frostbite, foot.....								2	2
Alopecia.....								1	1
Chilblain.....		2		2				4	6
Ulcer.....	16	170	98	74	2	1	11	507	693
Boil.....	2	67	56	9	1		3	583	652
Carbuncle.....		30	20	9			1	86	116
Whitlow.....		9	7	2				74	83
Onychia.....		16	14	2				48	64
Corn.....	1	3	3	1				27	31
Cheloid.....		1	1						1
Wen.....		7	6	1				9	16
Hyperidrosis.....								7	7
Pruritus.....		1		1				27	28
Lupus.....		1					1	1	2
Callosity.....		1	1					3	4
Rhinoscleroma.....		1		1				4	5
Injuries.....	120	2,252	1,523	669	21	25	134	4,960	7,332
GENERAL INJURIES.....	8	108	70	29	3	5	9	192	308
Effects of heat—									
Burns and scalds.....	3	67	44	18		4	4	138	208
Heat stroke.....	2	15	11	2	3	1		9	26
Sunstroke.....		2	1				1		2
Effects of cold.....		1		1				15	16
Effects of chemical irritants and corrosives.....		2	2					4	6
Multiple injury.....	2	18	9	7			4	12	32
Suffocation.....		2	1	1				10	12
Exhaustion.....		1	1						1
Shock.....	1		1					4	5
LOCAL INJURIES.....	112	2,144	1,453	640	18	20	125	4,768	7,024
Contusion of nerves.....								2	2
Wound of nerves.....		1					1		1
Contusion of internal viscera.....		1		1				1	2
Contusion of muscles.....		2	1	1				13	15
Strain of muscles.....		9	6	3				71	80
Rupture of muscles.....		2	2					3	5
Wound of muscle.....		1	1						1
Strain of tendons.....		2	2					3	5
Rupture of tendons.....								6	6
Wound of tendons.....								5	5
Contusion of skin.....		4	2	2				14	18
Abrasion of skin.....		3		3				73	76
Wound of skin.....		2		2				30	32
Burn or scald of skin.....	7	67	47	22			5	191	265
Frostbite.....		5	3	2				15	20
Effects on the skin of irritants or corrosives.....								14	14
Contusion of mucous membrane.....		1	1						1
Abrasion of mucous membrane.....								3	3
Burn or scald of mucous membrane.....		4	2	2				10	14
Effects on the mucous membrane of irritants or corrosives.....								2	2
Contusion of scalp.....		9	7	1			1	14	23
Wound of scalp.....	3	93	64	26			6	181	277
Contusion of skull.....		2	1	1				3	5
Fracture of the vault of skull.....	1	9	3	1		4	2	2	12

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
LOCAL INJURIES—Continued.									
Fracture of the base of skull.....		4		4					4
Wound of skull.....	1	2		3					3
Concussion of brain.....		11	4	5		1	1	2	13
Contusion of face.....	1	25	20	6				56	82
Wound of face and mouth.....	2	56	42	15			1	140	198
Foreign bodies in the nose, antrum, or other cavities.....		1	1					7	8
Fracture of facial bones.....	1	27	17	10			1	14	42
Dislocation of nasal cartilages.....		2	1	1				1	3
Contusion of eyelid.....		7	5	2				18	25
Wound of eyelid.....		5	4	1				16	21
Wound of conjunctiva.....		1	1					2	3
Contusion of eyeball.....		5	3	2				10	15
Foreign bodies in the conjunctiva or cornea.....		5	4				1	123	128
Foreign bodies in the eyeball.....								5	5
Wound of eyeball.....		6	3	3				3	9
Contusion of pinna.....		1	1					3	4
Wound of pinna.....		5	4	1				13	18
Rupture of membrana tympani.....		2	1				1	2	4
Foreign body in external meatus.....		1	1					4	5
Contusion of neck.....		2	1	1				4	6
Wound of neck.....		5	4	1				10	15
Foreign body in the food passages.....								4	4
Gunshot wound.....		10	6	2		1	1	3	13
Contusion of chest.....	2	37	25	14				140	179
Dislocation of costal cartilages.....		2	2					3	5
Fracture of ribs.....	3	90	54	34		2	3	70	163
Wound of parietes of chest.....	1	3	2	2				2	6
Penetrating wound of pleura or lung.....		1		1					1
Contusion of back.....	2	58	36	20	1		3	85	145
Sprain of back.....	1	31	23	8			1	99	131
Wound of back.....		8	6	1			1	7	15
Fracture of spine.....	1	4			1	4		1	6
Concussion of cord.....		2					2	1	3
Contusion of abdomen.....		8	6			1	1	15	23
Wound of parietes of abdomen.....		11	7	4				18	29
Contusion of the pelvis.....		5	4	1				4	9
Contusion of the perinæum, scrotum, or penis.....		1	1					1	2
Wound of the male urethra, perinæum, scrotum, testis, or penis.....		7	5	2				8	15
Rupture of urethra.....		1		1				1	2
Foreign body in the rectum.....		1	1						1
Fracture or dislocation of pelvic bones.....	1	6	3	3		1		2	9
Fracture spine, with displacement.....	1				1				1
Contusion of testicle.....		6	4	2				5	11
Contusion of upper extremities.....	3	71	47	25	1		1	367	441
Sprain of shoulder.....		6	4	2				78	84
Sprain of elbow.....		6	4	1	1			9	15
Sprain of wrist.....		26	16	9			1	128	154
Sprain of hand.....								14	14
Sprain of thumb.....		1	1					19	20
Sprain of fingers.....								8	8
Wound of upper extremities.....	14	296	194	100	2	1	13	1,377	1,687
Wound of joint, upper extremities.....		2		1			1	6	8
Fracture of clavicle.....	2	32	24	9			1	14	48
Fracture of scapula.....		1		1				1	2
Fracture of humerus.....	3	17	6	10	2		2	10	30
Fracture of bones of forearm—									
Radius.....		29	18	11				19	48
Ulna.....		6	2	3			1	7	13
Both bones.....	4	13	12	3	1		1	14	31

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1909—Continued.

Disease.	Number of cases.								
	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total treated in hospital and dispensary.
LOCAL INJURIES—Continued.									
Fracture of carpus, metacarpus, or phalanges.....	2	28	13	15	-----	-----	2	54	84
Dislocation of clavicle.....	-----	6	3	3	-----	-----	-----	3	9
Dislocation of humerus.....	1	27	17	11	-----	-----	-----	13	41
Dislocation of radius and ulna.....	1	4	3	1	-----	-----	1	3	8
Dislocation of phalanges of thumb.....	-----	1	1	-----	-----	-----	-----	1	2
Dislocation of phalanges of fingers.....	-----	3	2	-----	1	-----	-----	1	4
Amputation, arm.....	-----	1	-----	-----	-----	1	-----	-----	1
Insect bite.....	-----	-----	-----	-----	-----	-----	-----	9	9
Contusion of lower extremities.....	7	216	162	53	3	-----	5	347	570
Sprain of hip.....	3	6	6	2	-----	-----	1	27	36
Sprain of knee.....	1	14	12	3	-----	-----	-----	25	40
Sprain of ankle.....	4	139	96	37	-----	-----	10	174	317
Sprain of foot.....	1	8	4	5	-----	-----	-----	11	20
Internal derangement of joints.....	-----	2	1	1	-----	-----	-----	-----	2
Wound of lower extremities.....	12	302	236	58	1	2	17	425	739
Wound of joint, lower extremities.....	-----	6	3	3	-----	-----	-----	9	15
Fracture of femur.....	4	26	10	9	-----	-----	11	4	34
Fracture of cervix femoris.....	1	1	-----	1	1	-----	-----	-----	2
Fracture of patella.....	1	7	4	3	-----	-----	1	2	10
Fracture of tibia.....	3	26	19	4	1	-----	5	6	35
Fracture of fibula.....	1	26	15	8	-----	-----	4	9	36
Fracture of tibia and fibula.....	10	75	53	20	-----	1	11	4	89
Fracture of bones of foot—	-----	-----	-----	-----	-----	-----	-----	-----	-----
Of the tarsus.....	1	5	3	3	-----	-----	-----	3	9
Of the metatarsus.....	3	16	10	6	1	-----	2	4	23
Of the phalanges of the toes.....	1	4	4	-----	-----	-----	1	1	6
Dislocation of patella.....	-----	1	1	-----	-----	-----	-----	-----	1
Dislocation of tibia.....	-----	-----	-----	-----	-----	-----	-----	2	2
Dislocation of foot.....	-----	2	1	-----	-----	-----	1	-----	2
Dislocation of metatarsus and phalanges.....	-----	1	1	-----	-----	-----	-----	2	3
Amputation, toes.....	1	3	1	2	-----	1	-----	-----	4

TABLE V.—COMPARATIVE EXHIBIT—RATIO OF DEATHS FROM SPECIFIC CAUSES, 1900-1909.

Deaths from—	General average.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
General diseases.....	48.32	44.02	45.60	44.01	48.06	49.49	53.46	51.52	52.17	44.92	50.00
Diseases of the—	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Nervous system....	5.98	3.62	8.78	7.29	5.36	5.30	6.32	4.87	6.72	5.06	6.51
Circulatory system..	10.76	9.71	11.87	12.23	10.72	8.76	11.88	11.16	10.47	12.06	8.74
Respiratory system..	12.08	15.12	13.53	13.54	11.64	14.66	8.81	9.13	11.06	13.42	9.87
Digestive system....	6.94	9.70	6.65	7.55	7.39	7.33	4.79	5.88	5.34	4.67	10.08
Genito-urinary system.....	6.84	9.03	5.70	4.94	6.65	6.72	5.74	6.09	5.54	10.13	7.85
Injuries.....	6.68	6.32	5.22	7.55	6.47	5.09	7.09	9.13	7.12	7.20	5.61
From all other causes...	2.39	2.48	2.61	2.86	3.71	2.65	1.91	2.22	1.58	2.54	1.34

TABLE VI.—NATIVITIES OF PATIENTS TREATED IN HOSPITAL DURING THE FISCAL YEAR ENDED JUNE 30, 1909.

Country.	Number.	Country.	Number.
Total.....	14,204	Italy.....	58
Alaska.....	6	Japan.....	33
Australia.....	37	Mexico.....	11
Austria.....	137	Netherlands.....	45
Belgium.....	30	Newfoundland.....	80
Canada.....	401	Norway.....	1,023
Cape Verde Islands.....	85	Philippines.....	16
Chile.....	27	Porto Rico.....	26
China.....	22	Portugal.....	80
Cuba.....	4	Russia.....	119
Denmark.....	238	Scotland.....	198
England.....	483	Spain.....	185
Finland.....	356	Sweden.....	741
France.....	70	Switzerland.....	24
Germany.....	946	Turkey.....	14
Greece.....	78	United States.....	7,578
Hawaii.....	31	Wales.....	22
Ireland.....	716	West Indies.....	120
		Other countries.....	164

TABLE VII.—SURGICAL OPERATIONS, FISCAL YEAR 1909.

Operations.	Num-ber of cases.	Operations.	Num-ber of cases.
Total number of operations.....	1,568	ABSCESSES—Continued.	
TUMORS: Excision of.....	42	Connective tissue of—Continued.	
Adenoma, breast.....	1	Perineum.....	12
Angioma, arm.....	1	Perirectal.....	7
Carcinoma.....	6	Perirenal.....	1
Cystic tumor.....	3	Peritonsilar.....	8
Epithelioma.....	5	Periurethral.....	4
Fibroma.....	3	Psoas.....	2
Hæmangioma.....	1	Scrotum.....	2
Keloid.....	1	Upper extremity.....	35
Lipoma.....	9	Bursa.....	5
Papilloma.....	5	Cowper's gland.....	1
Sarcoma.....	5	Liver.....	3
Gumma.....	2	Muscle.....	1
CYSTS: Excision of.....	26	Parotid gland.....	1
Sebaceous.....	24	Prostate.....	1
Dermoid.....	1	Testicle.....	2
Cyst of epididymis.....	1	BLOOD VESSELS.....	40
FOREIGN BODIES: Removal of.....	7	Arteries—ligation of.....	3
From—		Veins—for varix—	
Connective tissue.....	1	Phlebotomy.....	7
Cornea.....	1	Phlebectomy.....	21
Foot.....	1	Schede's operation.....	9
Heel.....	1	NERVES: Suture after injury—musculo-	
Rectum.....	1	spiral.....	1
Hand.....	2	LYMPHATIC GLANDS.....	164
ABSCESSES: Incision and drainage.....	146	Incision and drainage of—	
Connective tissue of—		Axillary.....	2
Axilla.....	2	Inguinal.....	105
Back.....	4	Submaxillary.....	1
Buttock.....	3	Suprapubic.....	1
Chest.....	2	Enucleation of—	
Dental periosteum.....	3	Axillary.....	1
Elbow, tubercular.....	3	Cervical.....	8
Face.....	9	Inguinal.....	45
Hip.....	2	Excision for Hodgkin's disease—cervi-	
Ischio-rectal fossa.....	7	cal.....	1
Lumbar region.....	2	SKIN AND SUBCUTANEOUS TISSUE.....	85
Lower extremity.....	13	Incision and drainage for—	
Neck.....	8	Inflammation.....	13
Parasternal.....	2	Cellulitis.....	4
Penis.....	1	Curretting ulcers.....	4

TABLE VII.—SURGICAL OPERATIONS, FISCAL YEAR 1909—Continued.

Operations.	Num- ber of cases.	Operations.	Num- ber of cases.
SKIN AND SUBCUTANEOUS TISSUE—Cont'd.		JOINTS.....	42
Excision of—		Reduction of dislocation—	
Ulcers.....	3	Elbow.....	4
Scar tissue.....	2	Phalanges.....	2
Blastomycosis.....	1	Semilunar cartilage.....	1
Operations for onychia.....	12	Shoulder.....	11
Skin-grafting for—		Arthrotomy—	
Chronic ulcer.....	12	Elbow.....	1
Deformity of penis.....	3	Knee.....	14
Suture and dressing for wound of—		Shoulder.....	1
Body.....	2	Arthrectomy, for—	
Face.....	8	Tuberculosis of hip.....	1
Lower extremity.....	4	Tuberculosis of knee.....	2
Scalp.....	6	Halux valgus.....	4
Upper extremity.....	11	Arthrotomy and removal of semilunar cartilage.....	1
TRACHEA: Tracheotomy.....	1		
BONES.....	121	MUSCLES, TENDONS, AND FASCIA.....	9
Simple fracture—		Tenorrhaphy.....	2
Reduction, splints, or extension—		Lengthening tendons—	
Acromion process.....	1	Flexors of hand.....	1
Base of skull.....	2	Flexors of foot.....	1
Clavicle.....	3	Flexors of fingers.....	3
Femur.....	2	Incisions of fascia for Dupuytren's contracture.....	2
Fibula (Pott's).....	5		
Humerus.....	3	AMPUTATIONS.....	67
Maxilla, inferior.....	1	For disease or injury of—	
Metacarpal.....	2	Fingers.....	28
Metatarsal.....	3	Foot.....	2
Nasal.....	1	Leg.....	12
Radius (Colles).....	4	Thigh.....	6
Radius and ulnar.....	1	Toes.....	14
Ribs.....	4	Shoulder.....	1
Tibia.....	1	Forearm.....	4
Tibia and fibula.....	4		
Ulna.....	1	SKULL.....	22
Bone exposed and wired—		Trephining.....	6
Clavicle.....	1	Opening mastoid cells.....	7
Femur.....	2	Opening frontal sinus.....	1
Maxilla, inferior.....	2	Opening maxillary sinus.....	2
Patella.....	1	Exploratory craniotomy.....	1
Tibia and fibula.....	1	Curretting necrosed bone.....	1
Compound fracture—		Fracture.....	4
Reduction, wiring, splints—			
Humerus.....	2	SPINE AND SPINAL CORD.....	5
Nasal.....	1	Laminectomy.....	1
Patella.....	1	Correction of kyphosis.....	1
Radius and ulna.....	1	Lumbar puncture for diagnosis.....	3
Rib.....	1		
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Ulna.....	2	Excision of—	
Nonunion—		Lacrimal sac.....	2
Wiring and splints—		Nasal septum.....	1
Femur.....	3	Nasal pollypi.....	2
Radius.....	1	Portion of auricle.....	1
Tibia.....	2	Ranula.....	1
Ulna.....	1	Tonsils.....	11
Refractured and reset for deformity—		Uvula.....	2
Tibia and fibula.....	1	Extraction of teeth.....	7
Resection or curretage of portion of bone for disease, necrosis, or injury—			
Femur.....	4	EYE.....	14
Foot.....	1	Extraction of lens.....	2
Frontal bone.....	1	Suture wound, eyeball.....	1
Maxilla, inferior.....	8	Enucleation of eyeball for—	
Metatarsal.....	2	Injury.....	3
Os calcis.....	2	Glaucoma.....	1
Phalanges.....	8	Syphilitis keratitis.....	1
Radius.....	1	Operation for ectropion.....	1
Ribs.....	2	Excision of pterygium.....	3
Sternum.....	1	Iridotomy.....	1
Tibia.....	12	Aspiration subconjunctival cyst.....	1
Ulna.....	5		
Exploratory osteotomy—Tibia—gun- shot.....	1		
Incision and drainage—			
Abscess periosteum—			
Tibia.....	2		
Ulna.....	1		

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Operations.	Num- ber of cases.	Operations.	Num- ber of cases.
THORAX.....	17	URETHRA—Continued.	
Thoracentesis.....	14	Operations for—Continued.	
Resection of rib.....	3	Stricture—Continued.	
ABDOMEN.....	311	Internal urethrotomy.....	11
Paracentesis abdominalis.....	4	External urethrotomy.....	4
Excision post-operative scar.....	1	Suprapubic cystostomy.....	1
Abdominal section for—		Perineal section.....	1
Appendectomy, closure.....	43	Rupture or abscess—perineal sec-	
Appendectomy, drainage.....	21	tion.....	3
Appendicostomy.....	3	Urinary fistula—perineal section..	1
Volvulus.....	3		
Epiploexy (Talma).....	1	MALE ORGANS OF GENERATION.....	233
Enterorrhophy for—		Operations on penis—	
Gunshot wound, intestine.....	1	Circumcision for—	
Stab wound, intestines.....	1	Phimosis.....	111
Typhoid perforation.....	5	Herpes preputialis.....	1
Cholecystotomy.....	2	Primary syphilis.....	1
Choledochotomy.....	1	Soft chancre.....	1
Gastro jejunostomy.....	1	Dorsal incision for—phimosis or	
Freeing adhesions.....	2	soft chancre.....	10
Drainage.....	15	Amputation for—	
Exploration.....	6	Malignant disease.....	3
Closing fistula.....	6	Gangrene (partial).....	1
Gastrostomy.....	1	Cauterization for—ulcer.....	3
Herniotomy—		Incision and drainage for—ab-	
Inguinal—		scess.....	1
Bassini.....	152	Plastic operation for—malforma-	
Halsted.....	10	tion.....	1
Ferguson.....	12	Operations for varicocele—	
Andrews.....	1	Phlebotomy.....	4
Rectus transplantation.....	1	Phlebectomy.....	47
Strangulated inguinal.....	7	Operations for hydrocele—	
Femoral.....	2	Excision of sac.....	18
Post-operative.....	3	Tapping.....	8
Umbilical.....	3	Incision.....	7
Ventral.....	4	Castration.....	1
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Operations for—		cision.....	2
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Internal—		Excision of—	
Clamp and cautery.....	7	Cyst.....	1
Ligature and excision.....	12	Epididymis.....	1
External—		Operations on testicle—	
Clamp and cautery.....	8	Castration for—	
Ligature and excision.....	20	Cyst.....	1
Incision and packing.....	2	Tuberculosis.....	4
Whitehead method.....	1	Undescended testicle.....	2
Mixed—		Incision and drainage, for—abscess..	1
Clamp and cautery.....	22	Partial resection, for—tuberculosis..	1
Ligature and excision.....	6	Operations on prostate—	
Stricture of rectum—dilatation.....	3	Incision and drainage—for abscess..	1
Ulcer of rectum—resection portion		Dilation for—hypertrophy.....	1
rectum.....	1		
Anal fissure—incision.....	3	FEMALE ORGANS OF GENERATION:	
Fistulo in ano—		Salpingectomy.....	1
Incision.....	31		
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BLADDER.....	4		
External perineal urethrotomy.....	1	GUNSHOT WOUNDS OF:	
Dilatation for retention.....	3	Finger.....	1
URETHRA.....	37	Abdomen.....	1
Operations for—		Toe.....	1
Stricture—		Tibia.....	1
Gradual dilatation.....	16	Spinal cord.....	1
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		Amputation of—	
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